Vicinity Map

0 72 145

Scale 1: 870 Feet

Map Generated on: 12/22/2022

TOPOGRAPHIC & BOUNDARY SURVEY

LEGAL DESCRIPTION

LOTS 1 AND 2, CITY OF BELLEVUE SHORT PLAT NUMBER SP-87-7574, RECORDED UNDER RECORDING NO. 8803149004, IN KING COUNTY, WASHINGTON.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON

BASIS OF BEARINGS

A LINE COMPUTED PER REFERENCE NO. 1, BETWEEN FOUND MONUMENT AND REBAR/CAP BEARS N 67°34'44" E , AS SHOWN HEREON.

REFERENCES

R1. CITY OF BELLEVUE SHORT PLAT NO. FSP-87-7574, VOL. 60, PG. 10, RECORDS OF KING COUNTY, WASHINGTON.

VERTICAL DATUM

NAVD 88 PER CITY OF BELLEVUE BENCHMARK NO. 752
LOCATION: EAST SIDE OF INTERSECTION 104TH AVE SE & SE 16TH ST.
DESCRIPTION: 3" DIAMETER BRASS CAP SET IN CONCRETE STAMPED "KING COUNTY SURVEY" W/ "X" & PUNCH MK IN CASE; TOP MON TO TOP RIM CASE 1.23 FEET.
ELEVATION: 160.41'

SURVEYOR'S NOTES

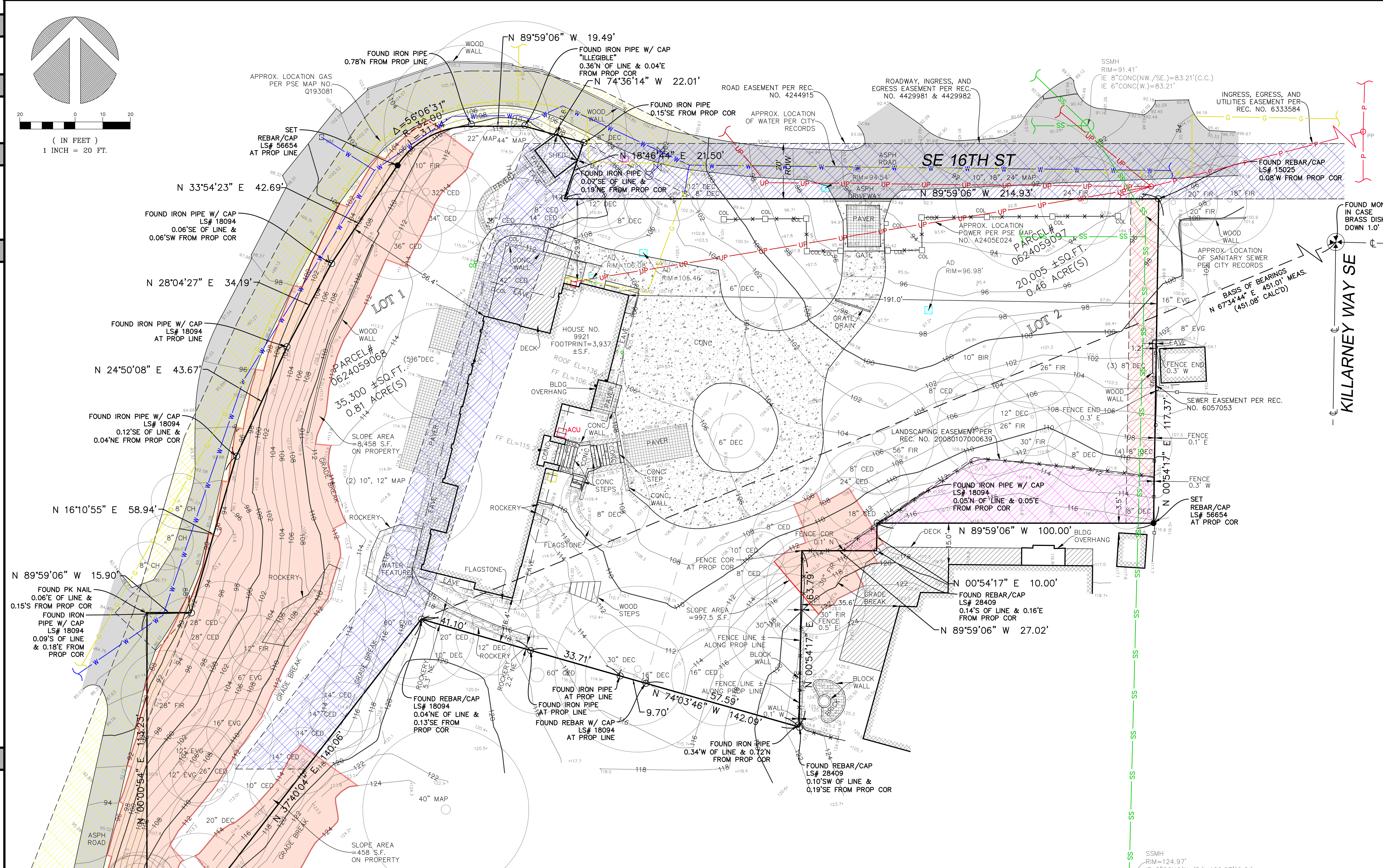
1. THE TOPOGRAPHIC SURVEY SHOWN HEREON WAS PERFORMED IN DECEMBER OF 2021. THE FIELD DATA WAS COLLECTED AND RECORDED ON MAGNETIC MEDIA THROUGH AN ELECTRONIC THEODOLITE. THE DATA FILE IS ARCHIVED ON DISC OR CD. WRITTEN FIELD NOTES MAY NOT EXIST. CONTOURS ARE SHOWN FOR CONVENIENCE ONLY. DESIGN SHOULD RELY ON SPOT ELEVATIONS.
2. ALL MONUMENTS SHOWN HEREON WERE LOCATED DURING THE COURSE OF THIS SURVEY UNLESS OTHERWISE NOTED.
3. THE TYPES AND LOCATIONS OF ANY UTILITIES SHOWN ON THIS DRAWING ARE BASED ON INFORMATION PROVIDED TO US, BY OTHERS OR GENERAL INFORMATION READILY AVAILABLE IN THE PUBLIC DOMAIN INCLUDING, AS APPLICABLE, IDENTIFYING MARKINGS PLACED BY UTILITY LOCATE SERVICES AND OBSERVED BY TERRANE IN THE FIELD. AS SUCH, THE UTILITY INFORMATION SHOWN ON THESE DRAWINGS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHOULD NOT BE RELIED ON FOR DESIGN OR CONSTRUCTION PURPOSES; TERRANE IS NOT RESPONSIBLE OR LIABLE FOR THE ACCURACY OR COMPLETENESS OF THIS UTILITY INFORMATION. FOR THE ACCURATE LOCATION AND TYPE OF UTILITIES NECESSARY FOR DESIGN AND CONSTRUCTION, PLEASE CONTACT THE SITE OWNER AND THE LOCAL UTILITY LOCATE SERVICE (800-424-5555).
4. SUBJECT PROPERTY TAX PARCEL NO. 062405-9097 & 062405-9068
5. SUBJECT TOTAL PROPERTY AREA PER THIS SURVEY IS 55,305 ±S.F. (1.27 ACRES)
   FOR PARCEL# 062405-9097 AREA=20,005 ±S.F. (0.46 ACRES)
   FOR PARCEL# 062405-9068 AREA=35,300 ±S.F. (0.81 ACRES)
6. THE PROPERTY DESCRIBED HEREON IS THE SAME AS THE PROPERTY DESCRIBED IN TITLE RESOURCES GUARANTY COMPANY, COMMITMENT NO. 50006998-103, WITH AN EFFECTIVE DATE OF JULY 27, 2021 AND THAT ALL EASEMENTS, COVENANTS AND RESTRICTIONS REFERENCED IN SAID TITLE COMMITMENT OR APPARENT FROM A PHYSICAL INSPECTION OF THE PROPERTY OR OTHERWISE KNOWN TO ME HAVE BEEN PLOTTED HEREON OR OTHERWISE NOTED AS TO THEIR EFFECT ON THE PROPERTY.
7. EXISTING STRUCTURE(S) LOCATION AND DIMENSIONS ARE MEASURED FROM THE FACE OF THE SIDING UNLESS OTHERWISE NOTED.
8. FIELD DATA FOR THIS SURVEY WAS OBTAINED BY DIRECT FIELD MEASUREMENTS WITH A CALIBRATED ELECTRONIC 5-SECOND TOTAL STATION AND/OR SURVEY GRADE GPS OBSERVATIONS. ALL ANGULAR AND LINEAR RELATIONSHIPS ARE ACCURATE AND MEET THE STANDARDS SET BY WAC 332-130-090.

LEGEND

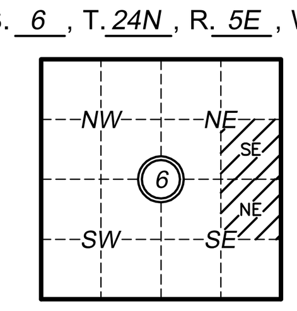
ACU	AC UNIT		PAVER SURFACE
	AREA DRAIN	P	POWER METER
	ASPHALT SURFACE	P	POWER (OVERHEAD)
	BRICK SURFACE	UP	POWER (UNDERGROUND)
	BUILDING	PP	POWER POLE
℄	CENTERLINE ROW		REBAR AS NOTED (FOUND)
SCO	CLEANOUT		REBAR & CAP (SET)
COL	COLUMN		ROCKERY
	CONCRETE SURFACE	SS	SEWER LINE
	RETAINING WALL		SEWER MANHOLE
	DECK	TEL SENTRY	TELEPHONE SENTRY
	FENCE LINE (CLF,IRON)	SIZE TYPE	TREE (AS NOTED)
	FENCE LINE (WOOD)	W	WATER LINE
	FIRE HYDRANT	WM	WATER METER
	FLAGSTONE SURFACE	WV	WATER VALVE
G	GAS LINE		ROADWAY, INGRESS, AND EGRESS EASEMENT
G	GAS METER		SEWER EASEMENT
	GUY ANCHOR		INGRESS, EGRESS, AND UTILITIES EASEMENT
	NAIL AS NOTED		LANDSCAPING EASEMENT
	HEAT EXCHANGER		ROAD EASEMENT
	MONUMENT IN CASE (FOUND)		STEEP SLOPE AREA

STEEP SLOPE/BUFFER DISCLAIMER:

THE LOCATION AND EXTENT OF STEEP SLOPES SHOWN ON THIS DRAWING ARE FOR INFORMATIONAL PURPOSES ONLY AND CANNOT BE RELIED ON FOR DESIGN AND/OR CONSTRUCTION. THE PITCH, LOCATION, AND EXTENT ARE BASED SOLELY ON OUR GENERAL OBSERVATIONS ON SITE AND OUR CURSORY REVIEW OF READILY AVAILABLE PUBLIC DOCUMENTS; AS SUCH, TERRANE CANNOT BE LIABLE OR RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ANY STEEP SLOPE INFORMATION. ULTIMATELY, THE LIMITS AND EXTENT OF ANY STEEP SLOPES ASSOCIATED WITH ANY SETBACKS OR OTHER DESIGN OR CONSTRUCTION PARAMETERS MUST BE DISCUSSED AND APPROVED BY THE REVIEWING AGENCY BEFORE ANY CONSTRUCTION CAN OCCUR.



SECTION INDEX:
KING COUNTY, WA
SE 1/4 OF THE SE 1/4 &
NE 1/4 OF THE SE 1/4 OF
S. 6 , T. 24N , R. 5E , W.M.



SCHEDULE B ITEMS

6. EASEMENT AND THE TERMS AND CONDITIONS THEREOF:
   PURPOSE: ROADWAY AND INGRESS AND EGRESS
   AREA AFFECTED: A PORTION OF SAID PREMISES
   RECORDED ON MARCH 26, 1954 AS INSTRUMENT #4429981 AND 4429982 IN THE OFFICIAL RECORDS.
   (PLOTTED ROADWAY AND INGRESS AND EGRESS EASEMENT DOCUMENT IS PARTIALLY ILLEGIBLE.)
7. RESERVATIONS CONTAINED IN INSTRUMENT RECORDED ON JUNE 13, 1952 AS INSTRUMENT #4244915 IN THE OFFICIAL RECORDS.
   (PLOTTED ROAD EASEMENT.)
8. EASEMENT AND THE TERMS AND CONDITIONS THEREOF:
   GRANTEE: BELLEVUE SEWER DISTRICT
   PURPOSE: SEWER PIPE LINE
   AREA AFFECTED: A PORTION OF SAID PREMISES RECORDED ON JULY 19, 1966 AS INSTRUMENT #6057053 IN THE OFFICIAL RECORDS.
   (PLOTTED SEWER EASEMENT.)
9. EASEMENT AND THE TERMS AND CONDITIONS THEREOF:
   PURPOSE: INGRESS, EGRESS AND UTILITIES
   AREA AFFECTED: A PORTION OF SAID PREMISES
   RECORDED ON APRIL 16, 1968 AS INSTRUMENT #6333584 IN THE OFFICIAL RECORDS.
   (PLOTTED INGRESS, EGRESS, AND UTILITIES EASEMENT.)
10. ALL COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, EASEMENTS OR OTHER SERVITUDES, IF ANY, DISCLOSED BY THE SHORT PLAT RECORDED AS INSTRUMENT #8803149004 IN THE OFFICIAL RECORDS.
    THIS POLICY DOES NOT INSURE THAT THE LAND DESCRIBED IN SCHEDULE A IS BENEFITED BY EASEMENTS, COVENANTS OR OTHER APPURTENANCES SHOWN ON THE PLAT OR SURVEY TO BENEFIT OR BURDEN REAL PROPERTY OUTSIDE THE BOUNDARIES OF SAID LAND.
    (BLANKET IN NATURE)
11. EASEMENT AND THE TERMS AND CONDITIONS THEREOF:
    PURPOSE: LANDSCAPING
    AREA AFFECTED: A PORTION OF SAID PREMISES RECORDED ON JANUARY 7, 2008 AS INSTRUMENT #20080107000639 IN THE OFFICIAL RECORDS.
    (PLOTTED LANDSCAPING EASEMENT.)
12. GUEST COTTAGE AGREEMENT AND THE TERMS AND CONDITIONS THEREOF:
    RECORDED ON APRIL 12, 2011 AS INSTRUMENT #20110412000141 IN THE OFFICIAL RECORDS.
    (NOTHING TO PLOT. RESTRICTIONS EXIST.)
13. SINGLE FAMILY USE AGREEMENT AND THE TERMS AND CONDITIONS THEREOF: RECORDED ON MAY 20, 2015 AS INSTRUMENT #20150520000327 IN THE OFFICIAL RECORDS.
    (NOTHING TO PLOT. RESTRICTIONS EXIST.)
14. STORM DRAINAGE OPERATIONS AND MAINTENANCE MANUAL AGREEMENT FOR UTILITIES STORM CONNECTIONS (MR 1-5) AND THE TERMS AND CONDITIONS THEREOF:
    RECORDED ON MARCH 24, 2017 AS INSTRUMENT #20170324000534 IN THE OFFICIAL RECORDS.
    (NOTHING TO PLOT. RESTRICTIONS EXIST.)

VICINITY MAP

N.T.S.

We are the measure | terrane.net

TOPOGRAPHIC & BOUNDARY SURVEY
PARCEL NO. 0624059097 & 0624059068
LUDWIG RESIDENCE
9921 SE 16TH ST
BELLEVUE, WA 98004

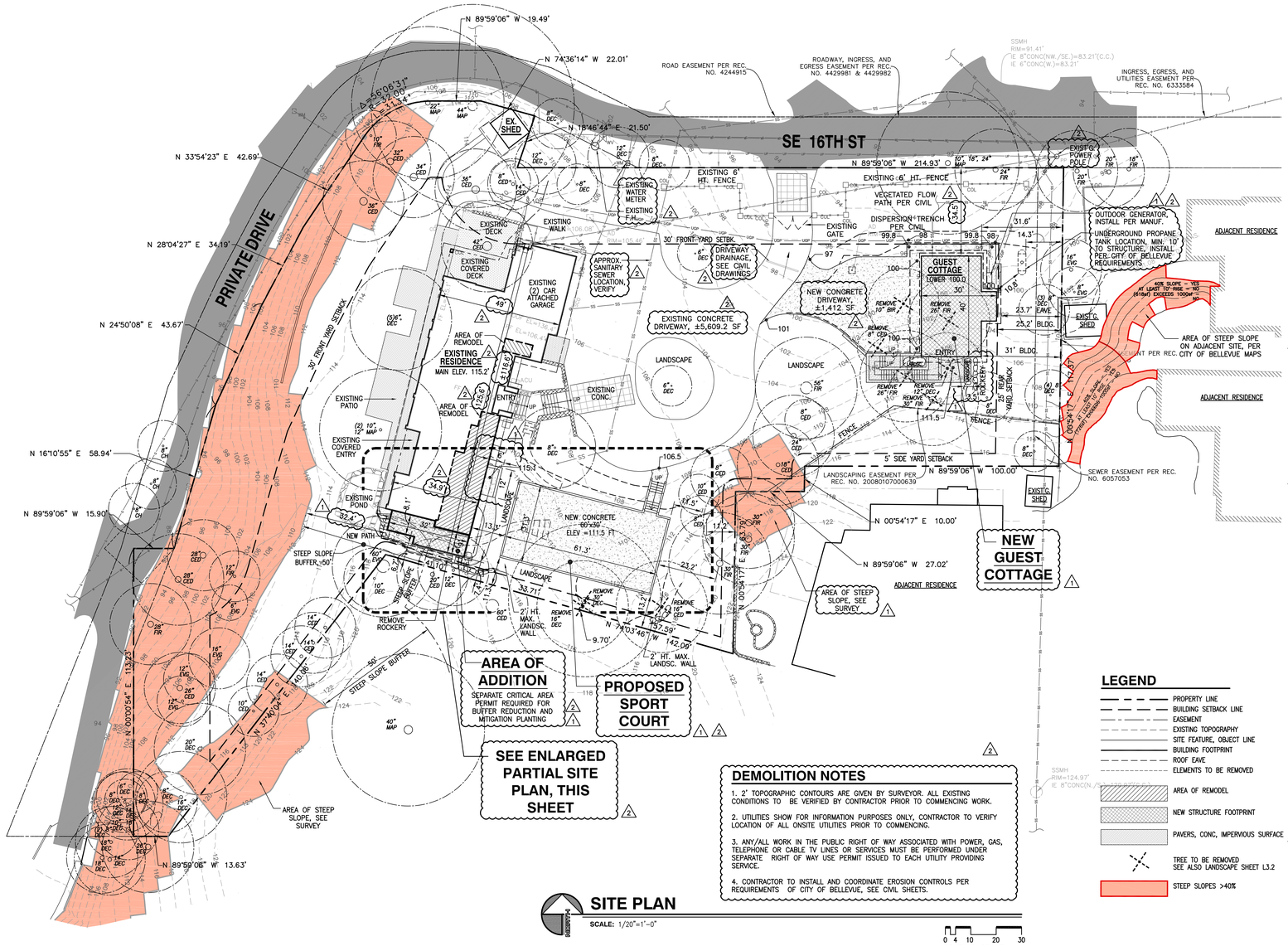
TERRANE
10801 Main Street, Suite 102
Bellevue, WA 98004
p: 425-458-4488 | e: info@terrane.net

JOB NUMBER:	10476
DATE:	12/15/21
DRAFTED BY:	IDV/GKD
CHECKED BY:	JGM/TBH
SCALE:	1" = 20'

REVISION HISTORY

09/14/22	ADD ADD'L ECA AREA

SHEET NUMBER
1 OF 1



SITE PLAN NOTES

1. SURVEY INFORMATION PER TERRANE SURVEY DATED 9/14/2022 1
2. TREES TO BE REMOVED FOR THIS PERMIT, SEE TREE REMOVAL PLAN, SHEET L3.2
3. CONTRACTOR TO VERIFY LOCATION OF UTILITIES PRIOR TO BEGINNING WORK
4. TEMPORARY STOCKPILES TO BE COVERED WITHIN 24 HOURS.
5. GRADING AND DRAINAGE PER CIVIL
6. GUEST COTTAGE MAY NOT BE RENTED OUT, PER BELLEVUE LAND USE CODE – 20.50.022 1

ZONING & CODE INFORMATION

1. Jurisdiction: BELLEVUE WASHINGTON
2. Present Zoning: R-1.8
3. Parcel Number: 062405-9068
4. Yard Setbacks
   Required: Front 30' Side 5'* Rear 25'
   * IF NO OPPOSING SIDE YARDS, SETBACK IS 5'
5. Height and Number of Stories
   Max. Building Height Allowed 30'/35' (ABOVE AVERAGE.) (GRADE ELEV.)

1

6. Lot Coverage by Structures
   See diagram Sheet A0.2

Site Area	55,305.0	Sq. Ft. (2022 BLA)
Steep Slope Critical Area Reduction	9,502.0	Sq. Ft.
Adjusted Net Site Area	45,803.0	Sq. Ft.
Allowable Structural Coverage (35%)	16,031.1	Sq. Ft.
Existing Structural Coverage	5,089.3	Sq. Ft.
New Additional Structural Coverage	3,784.1	Sq. Ft.
Total Proposed Structural Coverage	8,873.4	Sq. Ft.
Total Coverage / Lot Area = 8,873.4 sf / 45,803.0 sf	19.4%	less than 35% OK

1

7. Impervious Surface Area
   See diagram Sheet A0.2

Site Area	55,305.0	Sq. Ft. (2022 BLA)
Allowable Impervious Surface (45%)	24,887.3	Sq. Ft.
Existing Roof Area	5,109.1	Sq. Ft.
Existing Shed Roof	207.7	Sq. Ft.
Existing Driveway	5,609.2	Sq. Ft.
Existing Deck, Wall	332.9	Sq. Ft.
Existing Walks	881.5	Sq. Ft.
Existing Patio's	870.6	Sq. Ft.
Existing Pond	1,375.5	Sq. Ft.
Exempt Roof Overhangs	-(209.9)	Sq. Ft.
Total Existing Impervious Surface to Remain	13,281.0	Sq. Ft.
New Residence Roof	322	Sq. Ft.
New Residence Walk / Patio	236	Sq. Ft.
New Guest Cottage Roof	1,465.7	Sq. Ft.
New Driveway	1,411.9	Sq. Ft.
New Walk, Patio & Ret. Wall >30"	533.3	Sq. Ft.
New Sport Court / Walk	2,103.0	Sq. Ft.
Exempt Roof Overhangs	-(113.8)	Sq. Ft.
Total New Impervious Surface	5,978.1	Sq. Ft.
Total Proposed Impervious Surface	19,259.1	Sq. Ft.
Total Impervious / Lot Area = 19,259.1 sf / 55,305 sf	34.8%	less than 45% OK

8. Greenscape Calculations
   See diagram Sheet A0.2

Area of Front Yard Setback	17,247.7	Sq. Ft.
Required Front Yard Greenscape (50% of Front Yard Area)	8,623.9	Sq. Ft.
Front Yard Greenscape Provided	15,720.4	Sq. Ft. >50% ok 2

1

9. F.A.R. Table (Floor Area Ratio)

Site Area	55,305	Sq. Ft.
Existing Basement >5' ht. abv. grade	772	Sq. Ft.
Existing Main Floor	3,693	Sq. Ft.
Existing Upper Floor (>18' counted twice)	1,186	Sq. Ft.
Existing Accessory Structure, Shed	124	Sq. Ft.
Total Existing Floor Area	5,775	Sq. Ft.
Existing F.A.R. (5,775 sf / 55,305 sf)	.10	FAR
Proposed Main Floor Addition	272	Sq. Ft.
Guest Cottage Garage/Storage	945	Sq. Ft.
Guest Cottage Floor Area	700	Sq. Ft.
Proposed Total Floor Area	7,692	Sq. Ft.
Total Floor Area / Net Lot Area = 7,692 sf / 55,305 sf	.14	FAR No mitigation required

1

LEGEND

- PROPERTY LINE
- BUILDING SETBACK LINE
- EASEMENT
- EXISTING TOPOGRAPHY
- SITE FEATURE, OBJECT LINE
- BUILDING FOOTPRINT
- ROOF EAVE
- ELEMENTS TO BE REMOVED
- AREA OF REMODEL
- NEW STRUCTURE FOOTPRINT
- PAVERS, CONC, IMPERVIOUS SURFACE 1
- TREE TO BE REMOVED SEE ALSO LANDSCAPE SHEET L3.2
- STEEP SLOPES >40%

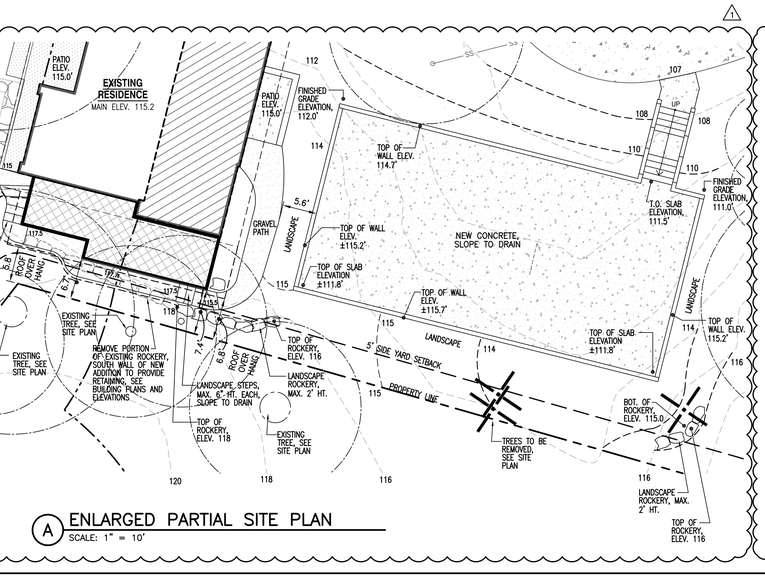
DEMOLITION NOTES

1. 2' TOPOGRAPHIC CONTOURS ARE GIVEN BY SURVEYOR. ALL EXISTING CONDITIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCING WORK.
2. UTILITIES SHOW FOR INFORMATION PURPOSES ONLY. CONTRACTOR TO VERIFY LOCATION OF ALL ONSITE UTILITIES PRIOR TO COMMENCING.
3. ANY/ALL WORK IN THE PUBLIC RIGHT OF WAY ASSOCIATED WITH POWER, GAS, TELEPHONE OR CABLE TV LINES OR SERVICES MUST BE PERFORMED UNDER SEPARATE RIGHT OF WAY USE PERMIT ISSUED TO EACH UTILITY PROVIDING SERVICE.
4. CONTRACTOR TO INSTALL AND COORDINATE EROSION CONTROLS PER REQUIREMENTS OF CITY OF BELLEVUE, SEE CIVIL SHEETS.

SITE PLAN

SCALE: 1/20"=1'-0"

0 4 10 20 30
GRAPHIC SCALE



A ENLARGED PARTIAL SITE PLAN
SCALE: 1" = 10'

AVERAGE EXISTING GRADE ELEVATION CALCULATION

AVERAGE GRADE CALC.	
POINT ▼/	EXIST. ELEV.
A	96.1
B	96.1
C	96.2
D	98.0
E	100.0
F	101.3
G	103.0
H	105.5
I	107.5
J	107.5
K	106.0
L	103.0
M	100.8
N	98.5
TOTAL	1,419.4

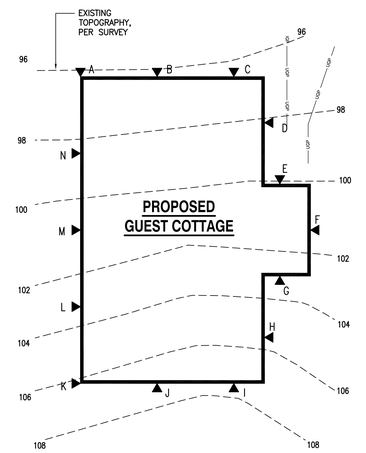
SUM OF A-Z 14 OF PTS.	1,419.5 14	101.4' AVE. ELEV.

NOTES:
AVERAGE GRADE ELEVATION 101.4'

ALLOWABLE HEIGHT 35', ELEVATION 136.4'

PROPOSED HEIGHT W/ CUPOLA, ELEVATION 130.15'

SEE ALSO WEST BUILDING ELEVATION, SHEET G3.1



1 GUEST COTTAGE, HEIGHT DIAGRAM
SCALE: 1/8"=1'-0"

CODE INFORMATION

All work shall conform to the following codes and by all other governing laws, jurisdictions, ordinances, and regulations:

2018 INTERNATIONAL BUILDING CODE (IBC)
2018 INTERNATIONAL RESIDENTIAL CODE (IRC)
2018 INTERNATIONAL MECHANICAL CODE (IMC)
INTERNATIONAL FUEL GAS CODE (NFPA 54)
2018 INTERNATIONAL FIRE CODE (IFC)
2018 WASHINGTON STATE ENERGY CODE, WAC 51-11 (WSEC)
2018 UNIFORM PLUMBING CODE (UPC)
NATIONAL ELECTRICAL CODE (NFPA 70)

BUILDING CLASSIFICATION

A. Occupancy Classification R-3, SINGLE FAMILY RESIDENCE U, PRIVATE GARAGE

B. Type of Construction
1. Automatic Sprinklers Provided No X Yes ____
2. Type of Construction TYPE V-B

ENERGY CODE INFORMATION

GUEST COTTAGE:

2018 WSEC Prescriptive for All Zones (Table R406.2)
BUILDING ADDITION, GREATER THAN 500 SF, LESS THAN 1,500 SF
3.0 Credits Required

HEATING OPTION #2 – Heat Pump – 1 credit

OPTION #1.3 – Efficient Building Envelope – .5 credits
New areas: Vertical Fenestration U = .28
New areas: Floor Insulation: R-38

OPTION #3.5 – High Efficiency HVAC Equipment – 1.5 credits
Air-Source, Centrally ducted heat pump with minimum HSPF of 11.0
An alternative heating source sized at a maximum of .5W/sf (equivalent) of heated floor area or 500 W, whichever is bigger

3.0 Credits Provided at Guest Cottage

WHOLE HOUSE FAN SIZING

See Architectural General Notes, Division 15, Heating and ventilation

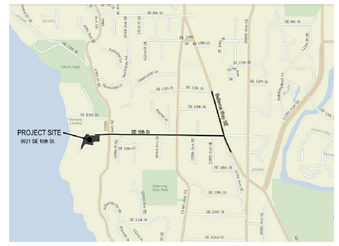
RESIDENCE ADDITION / REMODEL:

2018 WSEC Prescriptive for All Zones (Table R406.2)
BUILDING ADDITION, LESS THAN 500 SF
1.5 Credits Required

HEATING OPTION #2 – Existing Heat Pump – 1 credit
Equipment listed in Table C403.3.2(1) or (2)

OPTION #1.3 – Efficient Building Envelope – .5 credits
New areas: Vertical Fenestration U = .28
New areas: Floor Insulation: R-38

1.5 Credits Provided at Residence Addition



VICINITY MAP

NORTH

SCOPE OF WORK

SINGLE STORY ADDITION AND INTERIOR REMODEL OF THE PRIMARY RESIDENCE, NEW CARRIAGE HOUSE, SPORT COURT AND RECONFIGURATION OF DRIVEWAY

LEGAL DESCRIPTION

LOTS 1 AND 2, CITY OF BELLEVUE SHORT PLAT NUMBER SP-87-7574, RECORDED UNDER RECORDING NO. 8803149004, IN KING COUNTY, WASHINGTON

CONTACTS

OWNER/PROJECT ADDRESS:
LUDWIG, JOHN & CRISTI
9921 SE 16TH ST.
BELLEVUE, WA 98004
JOHN LUDWIG
PHONE:
EMAIL: john@theludwigs.com

CONTRACTOR:
SCHULTZ MILLER
1015 NE 113TH ST
SEATTLE, WA 98125
JEFF LEER, PROJECT MANAGER
PHONE: (206) 281-1234
DIRECT: (206) 661-8282
EMAIL: jleer@schultzmiller.com

ARCHITECT:
PETER D. SWINDLEY ARCHITECTS & INTERIORS
2223 112TH AVENUE N.E. #100
BELLEVUE, WA 98004
DAN KEATING, PRINCIPAL ARCHITECT
ROCKY JONES, PROJECT MANAGER
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STRUCTURAL ENGINEER:
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2124 THIRD AVE. SUITE 100
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KARL ROSMAN, PROJECT ENGINEER
PHONE: (206) 956-3745
EMAIL: krosman@safengineers.com

CIVIL ENGINEER:
DR STRONG
620 – 7th AVENUE
KIRKLAND, WA 98033
JONATHAN MURRAY, SR. PROJECT ENGINEER
PHONE: (425) 827-3063
EMAIL: konathan.murray@drstrong.com

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3213 EASTLAKE AVE. E, SUITE B
SEATTLE, WA 98102
BRYCE TOWNSEND, SR. GEOTECH ENGINEER
PHONE: (202) 262-0370
EMAIL: btownsend@pangeoinc.com

LANDSCAPE ARCHITECT:
KENNETH PHILP LANDSCAPE ARCHITECTS
2288 W COMMODORE WAY, SUITE 105
SEATTLE, WA 98199
KWATEE STAMM, PLA
PHONE: (610) 585-5327
EMAIL: katamm@kennethphilp.com

ARBORIST:
SUPERIOR NW ENTERPRISES
13110 NE 177th PLACE, SUITE 304
WOODINVILLE, WA 98072
ANTHONY MORAN, ISA CERTIFIED ARBORIST
PHONE: (206) 930-5724
EMAIL: anthony@superiornw.com

SURVEYOR:
TERRANE
10801 MAIN STREET, SUITE 102
BELLEVUE, WA 98004
ANDY MC ANDREWS
PHONE: (425) 458-4488
EMAIL: info@terrane.net

DRAWING INDEX

REGISTERED ARCHITECT 10875 DANIEL PHILIP KEATING STATE OF WASHINGTON

rev:
1 – CITY COMM. 22 NOV. 2022
2 – REVISIONS 22 NOV. 2022

drn by: MEK

date: 8 SEP 2022

9921 SE 16th Street
Bellevue, WA 98004

RESIDENCE REMODEL & ADDITION FOR:
CRISTI & JOHN LUDWIG

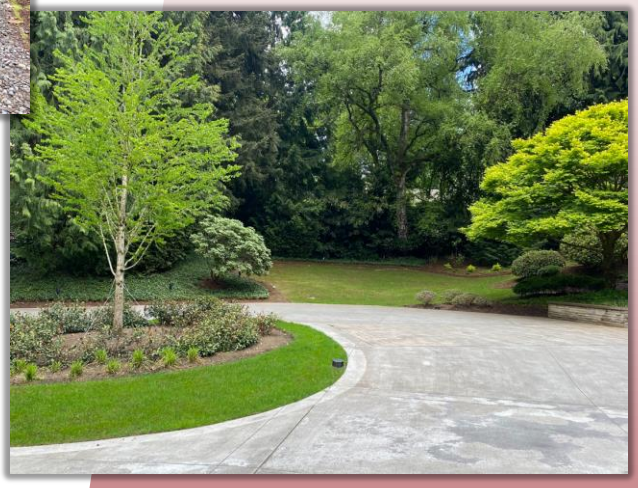
SITE PLAN & PROJECT DATA

peter d. swindley
architects and interiors inc.
2223 112th ave ne suite #100 bellevue wa 98004 425-455-9358

A0

GEOTECHNICAL AND CRITICAL AREAS REPORT
LUDWIG RESIDENCE
9921 SOUTHEAST 16TH STREET
BELLEVUE, WASHINGTON

Project No. 22-219
October, 2022



Prepared for:

Peter Swindley Architects

PanGEO INCORPORATED

Geotechnical & Earthquake Engineering Consultants

3213 Eastlake Avenue E, Suite B
Seattle, WA 98102-3513
Tel: 206.262.0370 Fax: 206.262.0374

PanGEO INCORPORATED
Geotechnical & Earthquake Engineering Consultants

October 27, 2022
File No. 22-219

Peter Swindley Architects
2223 112th Avenue NE, Suite 100
Bellevue, WA 98004
Attn: Daniel Keating

Subject: **Geotechnical and Critical Area Report – Revision 2**
Ludwig Residence
9921 Southeast 16th Street, Bellevue, Washington

Dear Mr. Keating,

As requested, PanGEO is pleased to present our geotechnical and critical area report for the proposed developments at the subject property. In preparing this report, we completed two test borings and two hand borings at the site, reviewed readily available geologic data, and conducted our engineering analyses to address the geotechnical elements of the Critical Areas Report (CAR), per Section 20.25H.145 of the Bellevue Land Use Code, and to support the design of the project.

In summary, our borings completed at the site encountered native, medium dense to very dense silty sand (Older Sand Deposits – Map Unit Qos) near the ground surface. Groundwater was not observed in our borings at the time of excavation.

In our opinion, the proposed developments, including the addition to the existing house, the detached carriage house, and sport court, may be supported by conventional footings. Temporary cuts may be sloped to a maximum 3/4H:1V. If space is not available for slope cuts, temporary shoring such as Ultra-blocks walls may be utilized.

We appreciate the opportunity to work on this project. Please call if there are any questions.

3214 Eastlake Avenue E East, Suite B
Seattle, WA 98102
Tel (206) 262-0370
Fax (206) 262-0374

Sincerely,

Bryce Townsend, P.E.
Senior Geotechnical Engineer

Encl.: Geotechnical and Critical Area Report

TABLE OF CONTENTS

LIST OF ATTACHMENTS

GEOTECHNICAL AND CRITICAL AREA REPORT – REVISION 2
LUDWIG RESIDENCE
9921 SOUTHEAST 16TH STREET
BELLEVUE, WASHINGTON

1.0 INTRODUCTION

This report presents the results of a geotechnical engineering study that was performed to support the design and construction proposed detached carriage house and sport court at the project site. We completed our study in general accordance with our Change Order #1 dated September 22, 2022, which was approved by you on the following day. Our service scope included reviewing available geologic and geotechnical data in the site vicinity, drilling test borings and hand borings, addressing the geotechnical elements of the Critical Areas Report (CAR) checklist per Section 20.25H.145 of the Bellevue Land Use Code (LUC), and developing the geotechnical design recommendations presented in this report.

2.0 PROJECT AND SITE DESCRIPTION

The project site is located at 9921 Southeast 16th Street in Bellevue, Washington (see Figure 1 – Vicinity Map). The property is a 55,303 square foot lot in a residential neighborhood. It is bordered to the east, south, and west by single-family residences and to the north by Southeast 16th Street.

The subject property is occupied by an existing single-family house generally situated on the west side of the property. There is a lawn and landscaped slope on the west side of the house that extends to the west property line. The east side of the property is occupied by a concrete circular driveway, small lawns, and landscaped slopes with shrubs, small trees, and occasional mature evergreens.

We understand that you plan construct an addition to the south side of the existing house, a detached two-story carriage house near the east side of the property, and a sport court near the southeast corner of the existing house (see Figure 2 – Site and Exploration Plan). The floor elevation for the addition to the existing house will generally match the existing house floor elevations. The carriage house will be benched into the toe of a north-facing slope on the east side of the site with excavations up to about 8 feet deep. The sport court will be partially benched into the toe of a slope on the south side of the court with up to 4 feet of fill on the north side of the court.

The overall property is situated on a west-facing slope on the west side of the property and a north-facing slope on the east side of the property. The grade around the proposed addition is relatively

level with the west side of the addition located about 30 feet from the top of the west-facing slope on the west side of the property (see Plates 1 and 2 on the following page). Based on our review of the topographic survey, the west-facing slope has a vertical relief of about 20 feet with a grade of about 50 to 60 percent. There is a paved driveway for the adjacent west property at the bottom of the slope.

The slope on the east side of the property where the detached carriage house is planned has a grade of about 20 to 25 percent and a vertical relief of about 18 feet. The slope on the south side of the property where the sport court is planned are about 10 to 14 percent with vertical relief of about 6 to 8 feet.

Based on our review of the Bellevue GIS Map, the slopes on the west side of the site are mapped as a steep slope critical area and the proposed addition is located within the 50-foot buffer from the top of the steep slope critical area, as shown on our Figure 2. As such, the proposed addition to the existing house is subject to land-use regulations associated with Bellevue Critical Areas and a Critical Areas Report (CAR) per the Bellevue LUC Section 20.25H.145 is required.

Plate 1. View of the existing conditions on the south side of the house where the proposed addition is planned, looking west.

Plate 2. View of the west side of the property near the top of the west-facing slope mapped as steep slope critical area, looking north.

Plate 3. North-facing slope on the east side of the property at the location of the proposed detached carriage house, looking west.

Plate 4. Existing lawn near the southeast corner of the existing house and south side of the roundabout driveway at the proposed sport court location, looking south.

The conclusions and recommendations in this report are based on our understanding of the proposed improvements, which is in turn based on the project information provided. If the above project description is incorrect, or the project information changes, we should be consulted to review the recommendations contained in this study and make modifications, if needed. In any case, PanGEO should be retained to provide a review of the final design to confirm that our geotechnical recommendations have been correctly interpreted and adequately implemented in the construction documents.

3.0 SUBSURFACE EXPLORATIONS

3.1 TEST BORINGS

Two test borings (PG-1 and PG-2) were drilled at the sites on October 12, 2022, at the approximate locations shown on the attached Figures 2 – Site and Exploration Plan. Boring PG-1 was drilled at the proposed addition location and PG-2 was drilled near the bottom of the proposed sport court. The borings were drilled to about 16½ and 11½ feet deep in borings PG-1 and PG-2, respectively.

The drill rig was equipped with 6-inch outside diameter hollow stem augers. Soil samples were obtained from the borings in general at 2½- and 5-foot depth intervals using Standard Penetration Test (SPT) sampling methods in general accordance with ASTM D1586, *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*, in which the samples are obtained using a 2-inch outside diameter split-spoon sampler. The sampler was driven into the soil a distance of 18 inches below the tip of the augers using a 140-pound weight falling a distance of 30 inches, with a rope-and-cathead mechanism. The number of blows required for each 6-inch increment of sampler penetration was recorded. The number of blows required to achieve the last 12 inches of sample penetration is defined as the SPT N-value. The N-value provides an empirical measure of the relative density of cohesionless soil, or the relative consistency of fine-grained soils.

An engineer from PanGEO was present during the field exploration to observe the drilling, assist in sampling, and to describe and document the soil samples obtained from the subsurface explorations. The soil samples from the subsurface explorations were described and field classified in general accordance with the symbols and terms outlined in Figure A-1, and the summary boring logs are included as Figures A-2 through A-3.

3.2 HAND BORINGS

PanGEO also completed two hand borings (HB-1 and HB-2) at the project site on May 20, 2022. HB-1 was advanced near the proposed carriage house on the east side of the site and HB-1 was advance near the bottom of the proposed sport court. The borings were advanced to about 2½ to 4 feet deep before reaching practical refusal in very dense soils. The approximate location of the borings are also shown on the attached Figure 2.

The borings were excavated and logged by a geologist from PanGEO, who also periodically evaluated the density and consistency of the soils by probing with a ½-inch diameter steel probe. The soil encountered in the hand borings were described using the system outlined on Figure A-1 of Appendix A. Summary hand boring logs are included as Figures A-4 and A-5 in Appendix A.

4.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

4.1 SITE GEOLOGY

According to *Preliminary Geologic Map of Seattle and Vicinity, Washington* (Waldron, H.H., et al, 1962), the surficial geology on the property is mapped as Vashon till (Map Unit Qt) with Older Sand (Map Unit Qos) mapped near the west property line. Vashon till is described by Waldron as

consists of a dense mixture of clay, silt, sand, and gravel with occasional cobbles and boulders. Till typically has a cemented texture with diamicts. Older Sand deposits are described by Waldron as dense uncemented sand. Both Vashon till and Older Sand deposits are glacially consolidated and typically exhibit low compressibility and high strength characteristics in their undisturbed states. Based on the results in our test borings and hand borings, the site soils appear more consistent with the Older Sand deposits.

4.2 SOIL

Both test borings PG-1 and PG-2 encountered about 2 to 9 inches of topsoil overlying medium dense, light brown to gray-brown, silty to slight silty, poorly graded, fine to medium sand. This soil unit became dense at 5 feet deep in both test borings and very dense at about 15 feet deep and 7½ feet deep in PG-1 and PG-2, respectively. In boring PG-1, at about 15 feet deep the soils became sandy silt with gravel. We interpret this soil unit as the mapped Older Sand deposits.

Both hand borings HB-1 and HB-2 also encountered about 3 to 4 inches of surficial topsoil, overlying Older Sand deposits consisting of medium dense to very dense, light brown, silty sand with gravel. Practical refusal was encountered at about 2½ and 4 feet deep in borings HB-1 and HB-2, respectively. The upper 2 to 3 feet of the native Older Sand deposits was weathered based on the medium dense condition and higher fines content than the soils below.

Our subsurface descriptions are based on the conditions encountered and observed at the time of our exploration. Soil conditions between exploration locations may vary from those encountered. The nature and extent of variations between our exploratory locations may not become evident until construction. If variations do appear, PanGEO should be requested to reevaluate the recommendations in this report and to modify or verify them in writing prior to proceeding with earthwork and construction.

4.3 GROUNDWATER

Groundwater was not encountered in our explorations at the time of drilling and excavation. It should be noted that groundwater levels will vary depending on the season, local subsurface conditions, and other factors. Groundwater levels are normally highest during the winter and early spring. Presence of perched groundwater seepage within dense sands should be anticipated, particularly during wet seasons.

5.0 GEOLOGIC CRITICAL AREAS ASSESSMENT

Based on our review of the Bellevue GIS Map, the property contains a steep slope geologic critical areas on the west-facing slope on the west side of the property. According to the Bellevue LUC Section 20.25H.120, a steep slope critical area has a buffer of 50 feet from the top and no buffer from the toe of the slope. A steep slope critical area has no structural setback from the top of the slope and a and structural setback of 75 feet from the toe of the slope. As such, a critical areas report is required for the project to reduce the associated critical area buffers, subject to the approval of the Director of the Development Services Department. The following sections provide our assessment of the geologic critical areas, per the LUC.

The slopes on the east side of the property are not mapped as steep slope critical areas. However, based on our review of the Bellevue GSI Map, there is a steep slope critical area on the adjacent east properties. According to the LUC Section 20.25H.120, a steep slope critical area is defined as, "Slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area." Based on our review of the project topographic survey prepared by Terrane and dated December 15, 2021, the steep slope area on the adjacent properties has a total area of about 726 square feet. As such, the mapped steep slope on the adjacent east property does not meet the criteria for a steep slope critical area and a CAR is not required for the project. Therefore, the proposed sport court and carriage house developments should not be subject to land-use regulations associated with Bellevue Critical Areas.

Based on our review of the steep slopes on the property relative to the proposed developments, the CAR checklist will only address the proposed addition to the existing house that encroaches in the mapped steep slope buffer on the west side of the property.

5.1 STEEP SLOPE CRITICAL AREA

During our site reconnaissance, we did not observe evidence of recent instability such as slide scarps, hummocky ground surface, or tension cracks around the existing house, along the south side of the house where the proposed addition is located, and in the west steep slope critical area. The area around the proposed addition on the south side of the existing house and up to 30 feet to the top of the mapped steep slope to the west is practically level with no signs of slope movement. The west slope appeared to be well landscaped with a variety of bushes and hedges, along with a gravel path with paver stairs (see Plate 5 below). The ground surface around slope vegetation appeared to be completely covered with mulch and topsoil. We also did not observe signs of

erosion on the ground. We did not observe signs of leaning or creep in the vegetation or pathway. Existing trees on the site slopes also appear vertical with no obvious signs of creeping soil (see foreground of Plate 5).

In our test boring PG-1, drilled on the south side of the existing house about 45 feet from the top of the slope, we encountered native medium dense to dense, silty to slightly silty sand (Older Sand deposits) at the ground surface. The Older Sand deposits typically exhibit high strength characteristics and are relatively stable in their undisturbed condition.

Plate 5. View of the existing conditions along the west slope, looking north.

Based on our onsite observations and the presence of native dense sand at shallow depths, it is our opinion that the slope near the existing house is globally stable. It is also our opinion that the construction of the proposed addition on the south side of the house will not adversely impact the stability of the existing house or the adjacent west properties, provided the recommendations presented in this report are properly incorporated into the design and construction of the project. However, it should be noted that any development on or near a steep slope area always involves

some level of risk. In addition, future activities on and off the site could also affect the stability of the site.

5.2 LANDSLIDE HAZARD CRITICAL AREA

According to the LUC 20.25H.120.A.1, a landslide hazard is defined as the following:

> *Areas of slopes of 15 percent or more with more than 10 feet of rise and display any of the following characteristics:*
>
> *a) Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides.*
> *b) Areas that have shown movement during the Holocene Epoch or that are underlain by landslide deposits.*
> *c) Slopes that are parallel or subparallel to planes of weakness in subsurface materials.*
> *d) Slopes exhibiting geomorphological features indicative of past failures such as hummocky ground and back-rotated benches on slopes.*
> *e) Areas with seeps indicating a shallow groundwater table on or adjacent to the slope face.*
> *f) Areas of potentially instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.*

Our response to the above criteria is as follows:

a) Based on our review of Light Detection and Ranging (LiDAR) imagery of the site vicinity, we did not identify signs of major slide scarps or hummocky ground that could indicate historic failures. A LiDAR image of the site sourced from the Washington DNR LiDAR Portal, can be seen in Plate 6 below.
b) Based on the results from our test borings, the site is underlain by native, dense, glacially consolidated sand. We did not encounter landslide deposits in our test borings that would indicate movement during the Holocene Epoch.
c) Based on the results from our test borings, the site soils are generally granular throughout our exploration depths with no notable change in soil consistency that could indicate a plane of weakness.
d) As stated in Section 5.1, we did not identify hummocky ground or back-rotated benches on the site slopes.

e) Groundwater was not encountered in our test borings and no seeps noted on the site slopes that could indicate shallow groundwater.
f) There are no rapid streams, stream banks, or wave action at the site.

In our opinion, the site does not meet the criteria defined by LUC 20.25H.120.1.A for landslide hazard critical area.

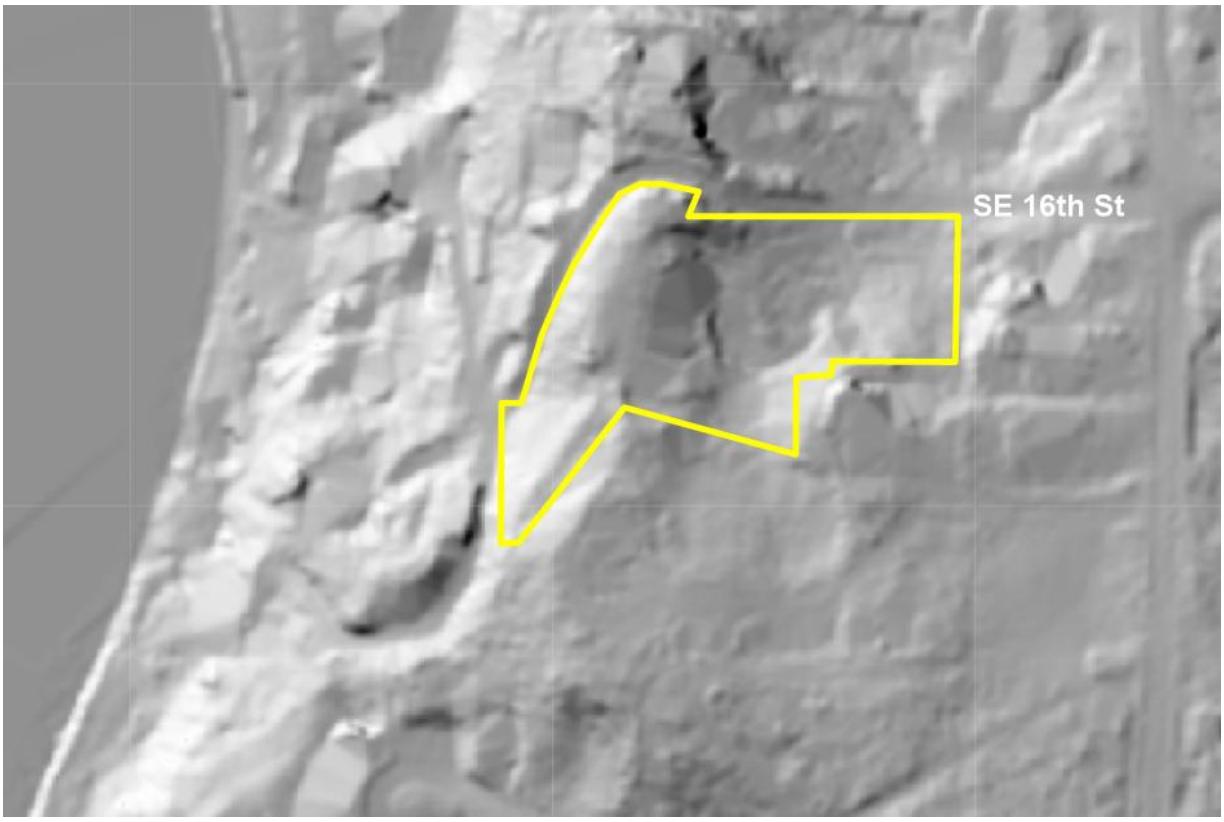


Plate 6. LiDAR image of the project site (Source: WSDNR LiDAR Portal, King County 2016).

5.3 EROSION HAZARDS EVALUATION

According to the City of Bellevue's Geologic Hazards Map, the site is mapped as being in a very high erosion hazard area. Based on the USDA Soil Survey data and our test borings, the site soils (Kitsap Silt Loam, KpD) are anticipated to exhibit moderate erosion potential when disturbed and left unprotected. In our opinion, the erosion hazards at the site can be effectively mitigated with the best management practice during construction and with properly designed and implemented landscaping for permanent erosion control. During construction, the temporary erosion hazard can also be effectively managed with an appropriate erosion and sediment control plan, including but

not limited to installing a silt fence at the construction perimeter, placing quarry spalls or hay bales at the disturbed and traffic areas, covering stockpiled soil or cut slopes with plastic sheets, constructing a temporary drainage pond to control surface runoff and sediment trap, placing rocks at the construction entrance, etc.

Permanent erosion control measures should be applied to the disturbed areas as soon as feasible. These measures may include but not limited to planting and hydroseeding. The use of permanent erosion control mat may also be considered in conjunction with planting/hydroseeding to protect the soils from erosion.

5.4 LIQUEFACTION HAZARDS EVALUATION

The City of Bellevue defines liquefaction hazard areas as those areas subject to severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction. According to the City of Bellevue's Geologic Hazards Map, there are no areas on the subject property that are mapped within a liquefaction hazard area. In addition, groundwater was not encountered in our explorations. Based on the lack of groundwater and presence of dense soil at relatively shallow depths, it is our opinion that the risk of liquefaction at the site is relatively low and that design considerations related to liquefaction are not necessary for this project.

6.0 GEOTECHNICAL RECOMMENDATIONS

6.1 SEISMIC SITE CLASS

The seismic design of the developments may be accomplished using the 2018 International Building Code (IBC), which specifies a design earthquake having a 2 percent probability of occurrence in 50 years (return interval of 2,475 years). The IBC seismic design parameters are in part based on the site soil conditions and site classifications defined in Chapter 20 of ASCE 7-16. According to Chapter 20 of ASCE 7-16, the site soil should be classified as Site Class C.

6.2 CONVENTIONAL FOOTINGS

Based on the results of our hand borings, native Older Sand deposits are anticipated to be present near the existing ground surface. As such, it is our opinion that the foundations for the proposed addition, detached carriage house, and retaining walls for the sport court may be supported by conventional footings bearing on the native sand, or on compacted structural fill placed on the

undisturbed native sand. The following sections present our recommendations for conventional footings:

6.2.1 Allowable Bearing Pressure

We recommend that a maximum allowable soil bearing pressure of 4,000 psf be used to size the footings. For allowable stress design, the recommended allowable bearing pressure may be increased by 1/3 for transient loading conditions such as wind and earthquake. Continuous and individual spread footings should have minimum widths of 18 and 24 inches, respectively. All footings should be founded at least 18 inches below adjacent finished grade.

6.2.2 Lateral Resistance

Lateral loads acting on footings may be resisted by passive earth pressure developed against the embedded portion of the footings and by frictional resistance developed at the base of the footings. For footings bearing on competent native sand or on structural fill, a frictional coefficient of 0.35 may be used to evaluate sliding resistance. Passive soil resistance may be calculated using an equivalent fluid pressure of 300 pcf, assuming the footings are backfilled and the backfill is adequately compacted. The above values include a factor of safety of 1.5. Unless covered by pavements or slabs, the passive resistance in the upper 12 inches of soil should be neglected.

6.2.3 Footing Over-Excavation and Subgrade Preparation

Footings should bear directly on the native and undisturbed native sand, or on compacted structural aggregate fill placed over native sand. We anticipate that medium dense to dense native glacial sand deposits to be present at the planned footing elevations with limited over-excavations to remove soft surficial soils where footings will be located near the existing grade.

Please note that the native sandy soil at the site is highly moisture sensitive and can be disturbed and softened when exposed to moisture. Any loose or softened soil should be removed from the footing excavations to expose undisturbed glacial sand deposits and backfilled with properly compacted structural fill. The adequacy of the footing subgrade should be verified by a representative of PanGEO, prior to placing forms or rebar.

Protection of the footing subgrade is the responsibility of the contractors. Please refer to Section 8.4 for recommendations for subgrade protection.

6.2.4 Foundation Performance

Total and differential settlements are anticipated to be within tolerable limits for footings designed and constructed as discussed above. Footing settlement under static loading conditions is estimated to be less than approximately ½ inch, and differential settlement between adjacent columns should be less than about ¼ inch. Most settlement will occur during construction as loads are applied.

6.2.5 Footing Drains

We recommend that perimeter footing drains be installed adjacent to new footings to provide permanent control of subsurface water. Please refer to Section 6.3.3 for recommendations for footing drain construction.

6.3 RETAINING WALL DESIGN PARAMETERS

Retaining walls should be properly designed to resist the lateral earth pressures exerted by the soils behind the wall. Adequate drainage provisions should also be provided behind the walls to intercept and remove groundwater that may be present behind the walls. Our geotechnical recommendations for the design and construction of the retaining walls built with drainage provisions are presented below.

6.3.1 Lateral Earth Pressures

Cantilevered retaining walls should be designed for an active equivalent fluid earth pressure of 35 pcf with level backslope and 50 pcf with a maximum backslope of 2H:1V. Basement walls (i.e., walls restrained at the top) should be design for an at-rest equivalent fluid pressure of 50 pcf level backslope and 65 pcf with a maximum backslope of 2H:1V.

In addition, the walls should be designed for a uniform lateral pressure of 9H pounds per square foot (psf) for seismic loading, where H corresponds to the retained height of the wall. The recommended lateral pressures assume that the backfill behind the wall consists of a free draining and properly compacted fill with adequate drainage provisions.

6.3.2 Surcharge

Surcharge loads, where present, should be included in the design of basement and retaining walls. We recommend that a lateral load coefficient of 0.4 be used to compute the lateral pressure on the

wall face resulting from surcharge loads located within a horizontal distance of one-half the wall height.

6.3.3 Wall Drainage

We recommend that perimeter wall/footing drains be installed to provide permanent control of subsurface water adjacent to the new structures. As a minimum, 4-inch diameter perforated drainpipes should be installed next to the base of the footings and embedded in 12 to 18 inches of clean gravel. The gravel should be wrapped in a geotextile filter fabric to prevent the migration of fines into the drain system. The drainpipe should be graded to direct water to a suitable outlet.

Where applicable, in-lieu of conventional footing drains, weep holes (2-inch diameter at maximum 10 feet on center) may be used for site retaining walls. We recommend a minimum 18-inch-wide zone of free draining granular soils (i.e., washed rock or equivalent) be placed adjacent to the wall for the full height of the wall. Alternatively, a composite drainage material, such as Miradrain 6000, may be used in lieu of the clean crushed rock.

Waterproofing considerations are beyond our expertise and scope of work. We recommend that a building envelope specialist be consulted to determine appropriate damp-proofing or water-proofing measures.

6.3.4 Wall Backfill

The existing on-site surficial soil is poorly graded, has a relatively high fines content, and is highly moisture sensitive. In our opinion, the on-site soils are not suitable for use as wall backfill. Wall backfill, if needed, should consist of imported free draining granular soils, such as those discussed in Section 8.2.

Wall backfill should be properly moisture conditioned, placed in loose, horizontal lifts less than 8 to 12 inches in thickness, and systematically compacted to a dense and relatively unyielding condition. The adequacy of the wall backfill should be verified by PanGEO during construction.

6.4 Concrete Slab-On-Grade Floors

It is our opinion that concrete slab-on-grade floors may be appropriate for the proposed developments, where needed. Concrete slab-on-grade floors may be supported on undisturbed glacial sand deposits or on structural fill placed over native sand. Loose or softened soils should

be removed from the slab subgrade and replaced with a minimum 1 foot of compacted structural fill to create a firm bearing surface for the slab. The adequacy of the slab subgrade should be evaluated by PanGEO during construction.

Concrete slab-on-grade floors should be underlain by a capillary break consisting of at minimum 6-inch-thick capillary break. The capillary break material should consist of ¾-inch crushed rock that meets the gradation requirements provided in Table 1 below.

Table 1. Capillary Break Gradation

Sieve Size	Percent Passing
¾-inch	100
No. 4	0 – 10
No. 100	0 – 5
No. 200	0 – 3

A minimum 10-mil polyethylene vapor barrier should also be placed directly below the slab. We also recommend that control joints be incorporated into the floor slab to control cracking.

6.5 Sport Court Considerations

We anticipate about 4 feet of fill will be needed on the north side of the sport court where the existing grade is lowest. Suitable structural fill for the sport court is described in Section 8.2.

Prior to receiving structural fill, the area of the sport court should be stripped and cleared of surface vegetation, organic matter, and other deleterious material. Existing utility pipes to be abandoned should be plugged or removed so they do not provide a conduit for water and cause soil saturation and stability problems.

In no case should the stripped or grubbed materials be used as structural fill or mixed with material to be used as structural fill. The stripped materials may be "wasted" onsite in non-structural landscaping areas, or they should be exported.

7.0 EXCAVATION AND SHORING RECOMMENDATIONS

7.1 TEMPORARY UNSUPPORTED SLOPE CUTS

All temporary excavations deeper than a total height of 4 feet should be sloped or shored. Where space is available, it is our opinion that unsupported open cut excavations are feasible.

Based on the presence of dense silty to slightly silty sand near the ground surface, for planning purposes, it is our opinion that temporary excavations may be sloped as steep as ¾H:1V. Where space is limited, the use of L-shaped footings may be considered to reduce the lateral extent of the proposed excavation.

Construction easements may be needed in areas with limited space to allow open cuts extend past the property boundaries. Temporary shoring will be needed if construction easements cannot be obtained.

All temporary excavations should be performed in accordance with Part N of WAC (Washington Administrative Code) 296-155. The contractor is responsible for maintaining safe excavation slopes and/or shoring. The temporary excavations and cut slopes should be re-evaluated in the field during construction based on actual observed soil conditions and may need to be flattered in the wet reasons and should be covered with plastic sheets. The cut slopes should be covered with plastic sheets in the raining season. We also recommend that heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within a distance equal to 1/3 the slope height from the top of any excavation.

7.2 ULTRA-BLOCK WALL

Based on our review of the site survey, there are several mature evergreen trees upslope (south) of the proposed detached carriage house location that are to remain in place. In addition, there are steep slope critical areas located on the adjacent properties to the west. Temporary shoring may be needed to avoid encroaching into existing trees. Based on the presence of dense silty sand at relatively shallow depths, in our opinion the temporary shoring can be accomplished using temporary concrete block wall shoring. We recommend that blocks consist of Ultra-blocks (2½ by 2½ by 5 feet in dimension). The block walls should have a maximum four blocks and installed with a 1H:6V batter.

We recommend that the following notes be incorporated into the project plans:

- Concrete blocks should consist of Ultra-blocks (2½ by 2½ by 5 feet in dimension)
- The maximum wall height should be limited four blocks high (i.e., 10 feet high);
- The vertical wall face should be no steeper than a batter of 1H:6V;
- The subgrade at the base of the blocks shall consist of dense native sand or leveling crushed rock placed on native sand;
- No excavation shall be made until blocks are available on site;
- The width of unsupported cut face for block placement shall be limited to no more than about 12 feet at any given time;
- Blocks shall be placed immediately after the cut is made, otherwise the cut face shall be buttressed with on-site soils until the blocks can be placed;
- Any voids behind blocks shall be backfilled with crushed clean gravel immediately after the block walls are installed; and
- PanGEO shall provide full time observation during block wall installation.

7.3 PERFORMANCE MONITORING

Ground movements will occur as a result of excavation activities. As such, ground surface elevations of the adjacent properties should be documented prior to commencing earthwork to provide baseline data. We will provide visual monitoring of the temporary Ultra-block shoring walls during construction. We also recommend that the existing conditions on the adjacent private properties be photo-documented prior to commencing on any earthworks at the site.

8.0 CONSTRUCTION CONSIDERATIONS

8.1 MATERIAL REUSE

In the context of this report, structural fill is defined as compacted fill placed under footings, concrete stairs, landings, and slabs, sport court, or other load-bearing areas. Structural fill should consist of well-graded granular material with minimal fines. The site soils are highly moisture sensitive, do not have a high percentage of gravel, and would be very difficult to meet the required

levels of compaction for structural fill. In our opinion, the on-site soils are not suitable to be reused as structural fill. Suitable material for use as structural fill is described in Section 8.2 below.

The on-site soil can be used as general fill in the non-structural and landscaping areas. If use of the on-site soil is planned, the excavated soil should be stockpiled and protected with plastic sheeting to prevent softening from rainfall in the wet season.

8.2 Structural Fill Placement and Compaction

For planning purposes, general structural fill should consist of imported, well-graded, granular material such as WSDOT Gravel Borrow per Section 9-03.14(1)) of the *WSDOT Standards and Specifications* (WSDOT, 2022), or an approved equivalent. For fill below the sport court, structural fill should consist of crushed surfacing base course (CSBC) per Section 9-03.9(3) of the *WSDOT Standards and Specifications* (WSDOT, 2022). Based on the lack of groundwater encountered in our explorations, recycled crushed concrete (maximum size of 1¼-inch) may also be considered as structural fill below the sport court.

Structural fill should be moisture conditioned to near its optimum moisture content, placed in loose, horizontal lifts less than 8 inches in thickness, and systematically compacted to a dense and relatively unyielding condition. The adequacy of the compaction should be verified by PanGEO. If density tests will be performed, the test results should indicate at least 95 percent of the maximum dry density, as determined using test method ASTM D1557. For utility backfill or backfill within 5 feet of retaining walls, the backfill should be compacted to 90 percent of the maximum dry density.

Depending on the type of compaction equipment used and depending on the type of fill material, it may be necessary to decrease the thickness of each lift in order to achieve adequate compaction. PanGEO can provide additional recommendations regarding structural fill and compaction during construction.

8.3 Surface Erosion and Drainage Considerations

Adequate drainage provisions are imperative to improve the performance of the proposed developments and adjacent structures. We recommend both short term and long-term drainage measures be incorporated into the project design and construction. Surface runoff can be controlled during construction by careful grading practices. Typically, this includes the construction of shallow, upgrade perimeter ditches or low earthen berms to collect runoff and

prevent water from entering the excavation or to prevent runoff from the construction area leaving the immediate work site. Collected water should be directed to a positive and permanent discharge system.

Permanent control of surface water and roof runoff should be incorporated in the final grading design. In addition to these sources, irrigation and rainwater infiltrating into landscape and planter areas adjacent to paved areas or building walls should also be controlled. All collected runoff should be directed into conduits that carry the water away from the proposed developments and existing structures and into the storm drain systems or other appropriate outlets. Adequate surface gradients should be incorporated into the grading design such that surface runoff is directed away from structures. Collected water from surface runoff should not drain into retaining wall drain systems.

8.4 WET WEATHER CONSTRUCTION

It is our opinion that construction of the project can be accomplished during the wet season (October to April). However, performing earthwork activities during the wet season is anticipated to be costlier than during dry weather conditions. The following procedures are best management practices recommended for use in wet weather construction:

- All footing subgrades should be protected against inclement weather unless the footings can be poured immediately after the subgrade is exposed. The contractor should be aware that the site soils are moisture sensitive due to its high fines content and could become disturbed and softened when exposed to inclement weather conditions. It is the contractor's responsibility to protect the subgrade from disturbance. One option is to place 2 to 3 inches of lean-mix concrete or 4 to 6 inches of crushed surfacing base course on the newly exposed subgrade as soon as it is exposed;

- During wet weather, the allowable fines content of the structural fill should be reduced to no more than 5 percent by weight based on the portion passing the 0.75-inch sieve. The fines should be non-plastic.

- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water.

- Geotextile silt fences should be installed at strategic locations around the construction area to control erosion and the movement of soil; and

- Excavation slopes and soils stockpiled on site should be covered with plastic sheeting.

9.0 PERFORMANCE STANDARDS CHECKLIST

The following section is the checklist of additional performance standards for developments located in landslide hazards and steep slopes, taken direction from LUC 20.25H.125, 20.25H.140, and 20.25H.145. Based on our review of the topographic survey and Bellevue GIS Map, the proposed addition located on the south side of the existing house is located within the steep slope critical area buffer. Our responses are shown below each item from the LUC addressing the proposed addition.

9.1 LUC 20.25H.125 PERFORMANCE STANDARDS – LANDSLIDE HAZARDS AND STEEP SLOPES

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;

Response: The proposed additions will be constructed generally within the existing level area on the south side of the existing house near the existing ground surface with little to no ground disturbance on the west steep slope area.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;

Response: The existing vegetation on the site slopes will remain undisturbed with most construction occurring on the south side of the existing house away from the steep slope.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;

Response: Based on the results of our subsurface explorations, the site soils consist of dense native granular soils at the ground surface. The site is considered globally stable and should not adversely affect the stability of the site or neighboring properties.

D. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;

Response: We do not anticipate significant retaining walls will be constructed as part of the proposed addition where the site grade is relatively level.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;

Response: The proposed improvements are intended to minimize the impervious surfaces within the critical area and critical area buffer. Collected surface water from new roofs should be directed to a suitable outlet and not discharged onto the existing slopes.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;

Response: There is no change in grade outside the proposed addition footprint.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;

Response: Building foundation walls will be designed as retaining walls.

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;

Response: The proposed addition will not be located on steep slopes.

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.

Response: Disturbed areas will be restored per Land Use Code. Mitigation and restoration plan may be needed and will be addressed by others.

9.2 LUC 20.25H.140 CRITICAL AREAS REPORT – ADDITIONAL PROVISIONS FOR LANDSLIDE HAZARDS AND STEEP SLOPES.

B. Area Addressed in Critical Area Report.

In addition to the general requirements of LUC 20.25H.230, the following areas shall be addressed in a critical areas report for geologically hazardous areas:

1. Site and Construction Plans. The report shall include a copy of the site plans for the proposal and a topographic survey;

Response: Please see the Figure 2 – Site and Exploration Plan, in this report.

2. Assessment of Geological Characteristics. The report shall include an assessment of the geologic characteristics of the soils, sediments, and/or rock of the project area and potentially affected adjacent properties, and a review of the site history regarding landslides, erosion, and prior grading. Soils analysis shall be accomplished in accordance with accepted classification systems in use in the region;

Response: Please see Section 4.0, in this report.

3. Analysis of Proposal. The report shall contain a hazards analysis including a detailed description of the project, its relationship to the geologic hazard(s), and its potential impact upon the hazard area, the subject property, and affected adjacent properties; and

Response: Please see Section 5.0, in this report.

4. *Minimum Critical Area Buffer and Building Setback. The report shall make a recommendation for a minimum geologic hazard critical area buffer, if any, and minimum building setback, if any, from any geologic hazard based upon the geotechnical analysis.*

   Response: This proposal intends to request a modification to the standard steep slope setback. Based on the results from our explorations and onsite observations, it is our opinion that the existing house is globally stable and that additional slope stabilization measures are not needed for the proposed addition. As such, we recommend that the critical area buffer and building setback be reduced to 20 feet (Please see Section 5.1 and Section 5.2 outlining our assessment of the steep slope and landslide critical areas).

9.3 LUC 20.25H.145 CRITICAL AREAS REPORT – APPROVAL OF MODIFICATION

Modifications to geologic hazard critical areas and critical area buffers shall only be approved if the Director determines that the modification:

A. *Will not increase the threat of the geological hazard to adjacent properties over conditions that would exist if the provisions of this part were not modified;*

   Response: The proposed improvements will not increase the threat of the site geological hazards to adjacent properties.

B. *Will not adversely impact other critical areas;*

   Response: The proposed addition will not have adverse impacts on the other critical areas.

C. *Is designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than would exist if the provisions of this part were not modified;*

   Response: Based on our study, the impact of the proposed addition to the existing west slope is practically negligible due to the presence of stable glacially consolidated soils at the ground surface.

D. *Is certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington;*

   Response: The geologic hazards and geotechnical elements of the project were evaluated by a qualified engineer licensed in the State of Washington.

E. The applicant provides a geotechnical report prepared by a qualified professional demonstrating that modification of the critical area or critical area buffer will have no adverse impacts on stability of any adjacent slopes, and will not impact stability of any existing structures. Geotechnical reporting standards shall comply with requirements developed by the Director in City of Bellevue Submittal Requirements Sheet 25, Geotechnical Report and Stability Analysis Requirements, now or as hereafter amended;

Response: The geotechnical report was prepared by a qualified engineer in general accordance with the City of Bellevue's submittal requirements.

F. Any modification complies with recommendations of the geotechnical support with respect to best management practices, construction techniques or other recommendations; and

Response: The geotechnical elements of the proposed project should be constructed in general accordance with the recommendations contained in this geotechnical report.

10.0 ADDITIONAL SERVICES

To confirm that our recommendations are properly incorporated into the design and construction of the proposed development, PanGEO should be retained to conduct a review of the final project plans and specifications, and to monitor the construction of geotechnical elements. Modifications to our recommendations presented in this report may be necessary, based on the actual conditions encountered during construction.

11.0 LIMITATIONS

We have prepared this report for use by Peter Swindley Architects and the project design team. Recommendations contained in this report are based on a site reconnaissance, review of pertinent subsurface information, and our understanding of the project. The study was performed using a mutually agreed-upon scope of work.

Variations in soil conditions may exist between the explorations and the actual conditions underlying the site. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at the site that are different from those described in this report, we should be notified immediately to review the applicability of our recommendations.

Additionally, we should also be notified to review the applicability of our recommendations if there are any changes in the project scope.

The scope of our work does not include services related to construction safety precautions. Our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design. Additionally, the scope of our work specifically excludes the assessment of environmental characteristics, particularly those involving hazardous substances. We are not mold consultants nor are our recommendations to be interpreted as being preventative of mold development. A mold specialist should be consulted for all mold-related issues.

This report may be used only by the client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both off and on-site), or other factors including advances in our understanding of applied science, may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 24 months from its issuance. PanGEO should be notified if the project is delayed by more than 24 months from the date of this report so that we may review the applicability of our conclusions considering the time lapse.

It is the client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk. Any party other than the client who wishes to use this report shall notify PanGEO of such intended use and for permission to copy this report. Based on the intended use of the report, PanGEO may require that additional work be performed and that an updated report be reissued. Noncompliance with any of these requirements will release PanGEO from any liability resulting from the use this report.

Within the limitation of scope, schedule and budget, PanGEO engages in the practice of geotechnical engineering and endeavors to perform its services in accordance with generally accepted professional principles and practices at the time the Report or its contents were prepared. No warranty, express or implied, is made.

We appreciate the opportunity to be of service to you on this project. Please feel free to contact our office with any questions you have regarding our study, this report, or any geotechnical engineering related project issues.

Sincerely,

PanGEO Inc.

10/27/2022

Bryce C. Townsend, P.E.
Senior Geotechnical Engineer

10/27/2022

Siew L. Tan, P.E.
Principal Geotechnical Engineer

12.0 REFERENCES

ASCE, 2016, *ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures.*

ASTM D1557, 2012, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort*, www.astm.org.

ASTM D1586 / D1586-18, 2018, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*, www.astm.org.

Waldron, H.H., Liesch, B.A., Mullineaux, D.R., Crandell, D.R., 1962, *Preliminary Geologic Map of Seattle and Vicinity, Washington*, USGS Miscellaneous Geologic Investigations Map I-354.

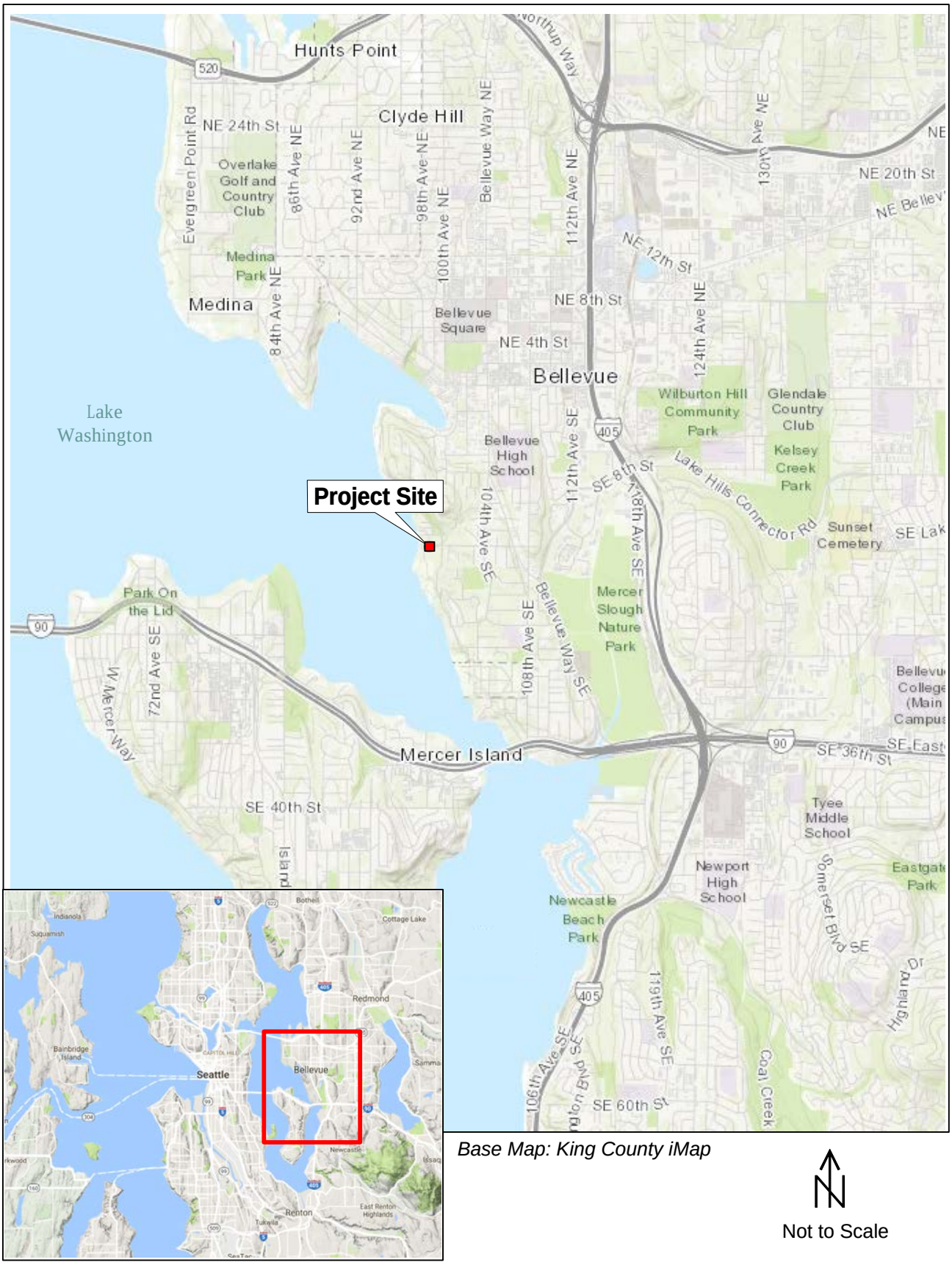
International Code Council, 2018, *International Building Code (IBC).*

USDA, 2022, Web Soil Survey, https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Washington Administrative Code (WAC), 2013, Chapter 296-155 - *Safety Standards for Construction Work, Part N - Excavation, Trenching, and Shoring*.

WSDNR, 2022, Washington Lidar Portal, https://lidarportal.dnr.wa.gov/

WSDOT, 2022, *Standard Specifications for Road, Bridges, and Municipal Construction, M41-10*.



Base Map: King County iMap

Not to Scale

PanGEO INCORPORATED

Ludwig Residence
9921 SE 16th Street
Bellevue, Washington

VICINITY MAP

Project No.	Figure No.
22-219	**1**

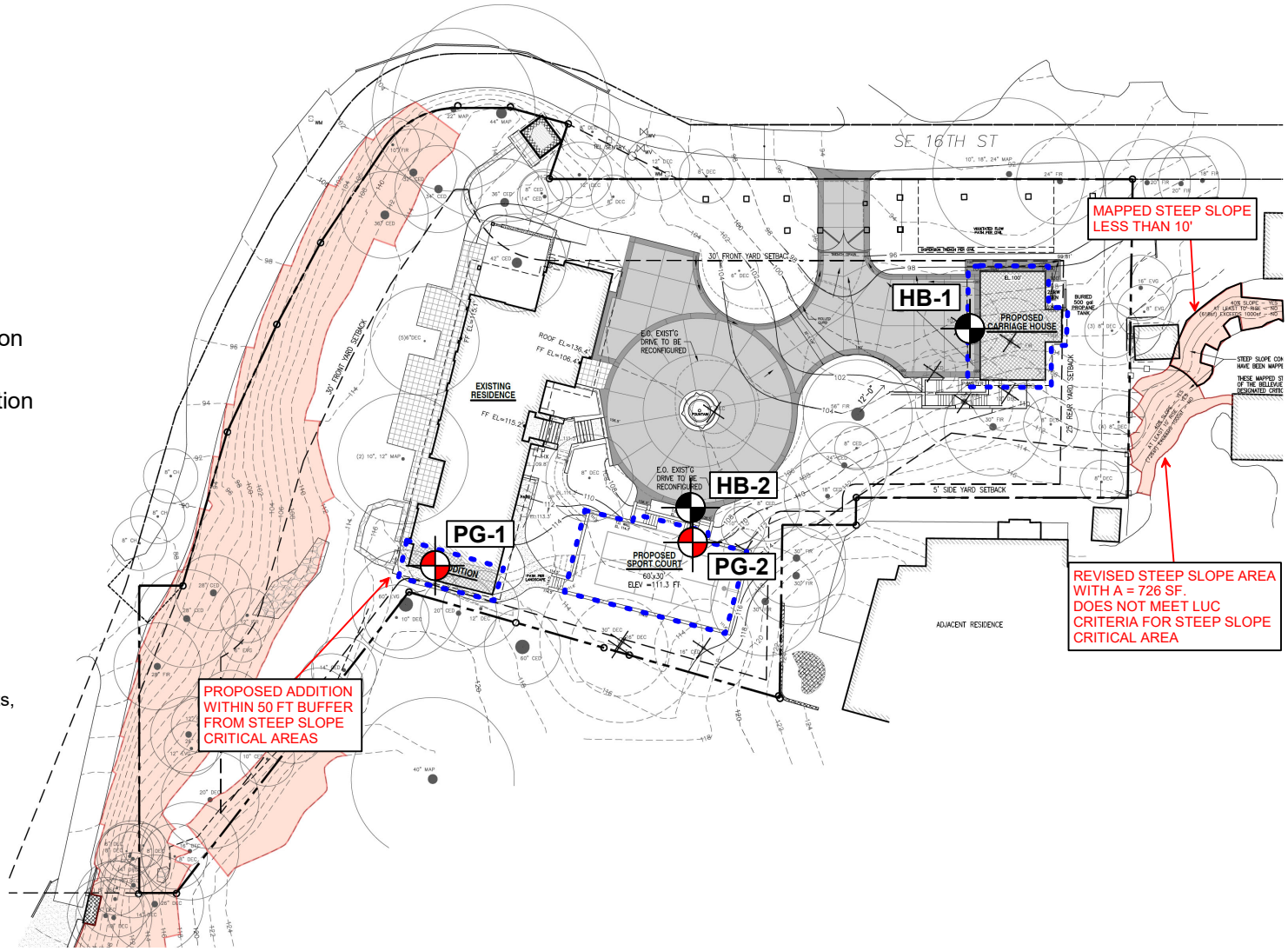
Approx. Scale
1" = 60'

Legend:

- Approx. Test Boring Location
- Approx. Hand Boring Location
- Proposed New Structures
- Mapped Steep Slopes per Bellevue GIS Map

Notes:

1. Base map modified from Architectural Site Plan A0 by Peter Swindley Architects, dated July 1, 2022.



PanGEO INCORPORATED

Ludwig Residence
9921 SE 16th Street
Bellevue, Washington

SITE AND EXPLORATION PLAN

Project No. **22-219**

Figure No. **2**

APPENDIX A

SUMMARY BORING LOGS

RELATIVE DENSITY / CONSISTENCY

SAND / GRAVEL			SILT / CLAY		
Density	SPT N-values	Approx. Relative Density (%)	Consistency	SPT N-values	Approx. Undrained Shear Strength (psf)
Very Loose	<4	<15	Very Soft	<2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Med. Dense	10 to 30	35 - 65	Med. Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	>50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	>30	>4000

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		GROUP DESCRIPTIONS	
Gravel 50% or more of the coarse fraction retained on the #4 sieve. Use dual symbols (eg. GP-GM) for 5% to 12% fines.	GRAVEL (<5% fines)	GW	Well-graded GRAVEL
		GP	Poorly-graded GRAVEL
	GRAVEL (>12% fines)	GM	Silty GRAVEL
		GC	Clayey GRAVEL
Sand 50% or more of the coarse fraction passing the #4 sieve. Use dual symbols (eg. SP-SM) for 5% to 12% fines.	SAND (<5% fines)	SW	Well-graded SAND
		SP	Poorly-graded SAND
	SAND (>12% fines)	SM	Silty SAND
		SC	Clayey SAND
Silt and Clay 50%or more passing #200 sieve	Liquid Limit < 50	ML	SILT
		CL	Lean CLAY
		OL	Organic SILT or CLAY
	Liquid Limit > 50	MH	Elastic SILT
		CH	Fat CLAY
		OH	Organic SILT or CLAY
Highly Organic Soils		PT	PEAT

Notes: 1. Soil exploration logs contain material descriptions based on visual observation and field tests using a system modified from the Uniform Soil Classification System (USCS). Where necessary laboratory tests have been conducted (as noted in the "Other Tests" column), unit descriptions may include a classification. Please refer to the discussions in the report text for a more complete description of the subsurface conditions.

2. The graphic symbols given above are not inclusive of all symbols that may appear on the borehole logs. Other symbols may be used where field observations indicated mixed soil constituents or dual constituent materials.

DESCRIPTIONS OF SOIL STRUCTURES

Layered: Units of material distinguished by color and/or composition from material units above and below

Laminated: Layers of soil typically 0.05 to 1mm thick, max. 1 cm

Lens: Layer of soil that pinches out laterally

Interlayered: Alternating layers of differing soil material

Pocket: Erratic, discontinuous deposit of limited extent

Homogeneous: Soil with uniform color and composition throughout

Fissured: Breaks along defined planes

Slickensided: Fracture planes that are polished or glossy

Blocky: Angular soil lumps that resist breakdown

Disrupted: Soil that is broken and mixed

Scattered: Less than one per foot

Numerous: More than one per foot

BCN: Angle between bedding plane and a plane normal to core axis

COMPONENT DEFINITIONS

COMPONENT	SIZE / SIEVE RANGE	COMPONENT	SIZE / SIEVE RANGE
Boulder:	> 12 inches	Sand	
Cobbles:	3 to 12 inches	Coarse Sand:	#4 to #10 sieve (4.5 to 2.0 mm)
Gravel		Medium Sand:	#10 to #40 sieve (2.0 to 0.42 mm)
Coarse Gravel:	3 to 3/4 inches	Fine Sand:	#40 to #200 sieve (0.42 to 0.074 mm)
Fine Gravel:	3/4 inches to #4 sieve	Silt	0.074 to 0.002 mm
		Clay	<0.002 mm

TEST SYMBOLS

for In Situ and Laboratory Tests listed in "Other Tests" column.

ATT	Atterberg Limit Test
Comp	Compaction Tests
Con	Consolidation
DD	Dry Density
DS	Direct Shear
%F	Fines Content
GS	Grain Size
Perm	Permeability
PP	Pocket Penetrometer
R	R-value
SG	Specific Gravity
TV	Torvane
TXC	Triaxial Compression
UCC	Unconfined Compression

SYMBOLS

Sample/In Situ test types and intervals

- 2-inch OD Split Spoon, SPT (140-lb. hammer, 30" drop)
- 3.25-inch OD Spilt Spoon (300-lb hammer, 30" drop)
- Non-standard penetration test (see boring log for details)
- Thin wall (Shelby) tube
- Grab
- Rock core
- Vane Shear

MONITORING WELL

- Groundwater Level at time of drilling (ATD)
- Static Groundwater Level
- Cement / Concrete Seal
- Bentonite grout / seal
- Silica sand backfill
- Slotted tip
- Slough
- Bottom of Boring

MOISTURE CONTENT

Dry	Dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water

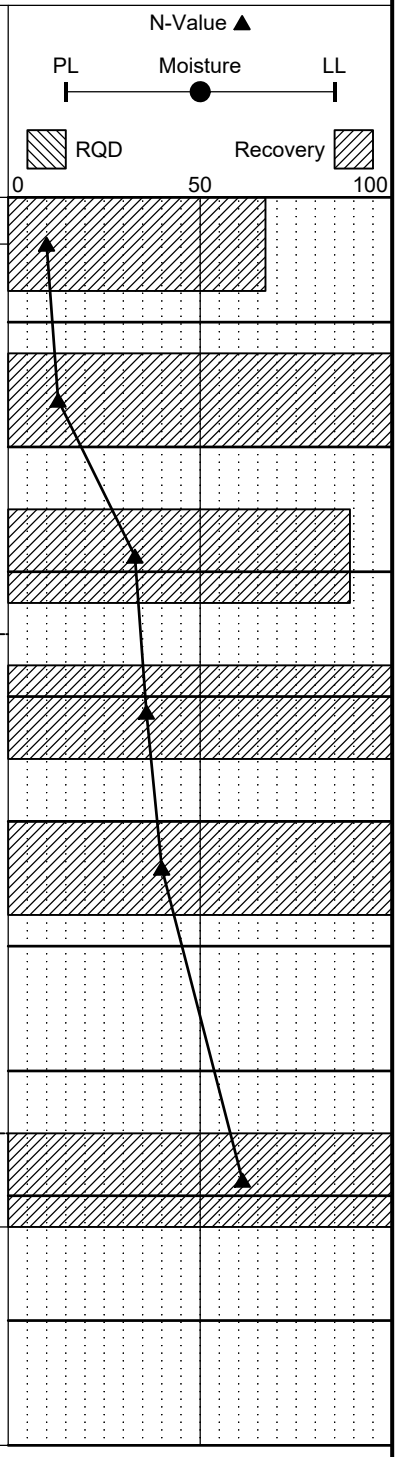
PanGEO INCORPORATED
Phone: 206.262.0370

Terms and Symbols for Boring and Test Pit Logs

Figure A-1

Project:	Ludwig Residence	Surface Elevation:	Approx. El. 118'
Job Number:	22-219	Top of Casing Elev.:	N/A
Location:	9921 SE 16th Street, Bellevue, Washington	Drilling Method:	HSA, Mini Bobcat Track Rig
Coordinates:	Northing: , Easting:	Sampling Method:	SPT, Rope & Cathead

Depth, (ft)	Sample No.	Sample Type	Blows / 6 in.	Other Tests	Symbol	MATERIAL DESCRIPTION
0						
	S-1		3 4 6			About 9 inches of loose **TOPSOIL** and mulch at ground surface.
						[OLDER SAND DEPOSITS - Qos]
2						Medium dense, light brown, silty SAND; moist, trace gravel, fine to medium sand, faint lamination present, iron oxide staining.
	S-2		6 6 7			- Interbeds of poorly graded SAND and sandy SILT present.
4						
	S-3		14 16 17			- Becomes dense, silty fine-to-medium SAND. Pocket of gravel in upper 4 inches of sample. Faint lamination visible in sand.
6						
	S-4		12 15 21			Dense, gray-brown, slightly silty, poorly graded SAND; moist, fine sand, massive consistency.
8						
	S-5		13 18 22			
10						
12						
14						
	S-6		15 30 31			Very dense, gray-brown, sandy SILT with gravel; moist, very fine sand.
16						Boring terminated at about 16.5 feet below ground surface and abandoned with bentonite. No groundwater was encountered during drilling.
18						
20						



Completion Depth:	16.5ft
Date Borehole Started:	10/12/22
Date Borehole Completed:	10/12/22
Logged By:	A. Ong
Drilling Company:	Geologic Drill Partners, Inc.

Remarks: Standard penetration test (SPT) sampler driven with a 140 lb. safety hammer. Hammer operated with a rope and cathead mechanism. The elevations are approximated from the project topographic survey by Terrane, dated 12/15/2021, and measuring from known site features. This information is provided for relative information only and is not a substitution for field survey. **Datum: NAVD88**

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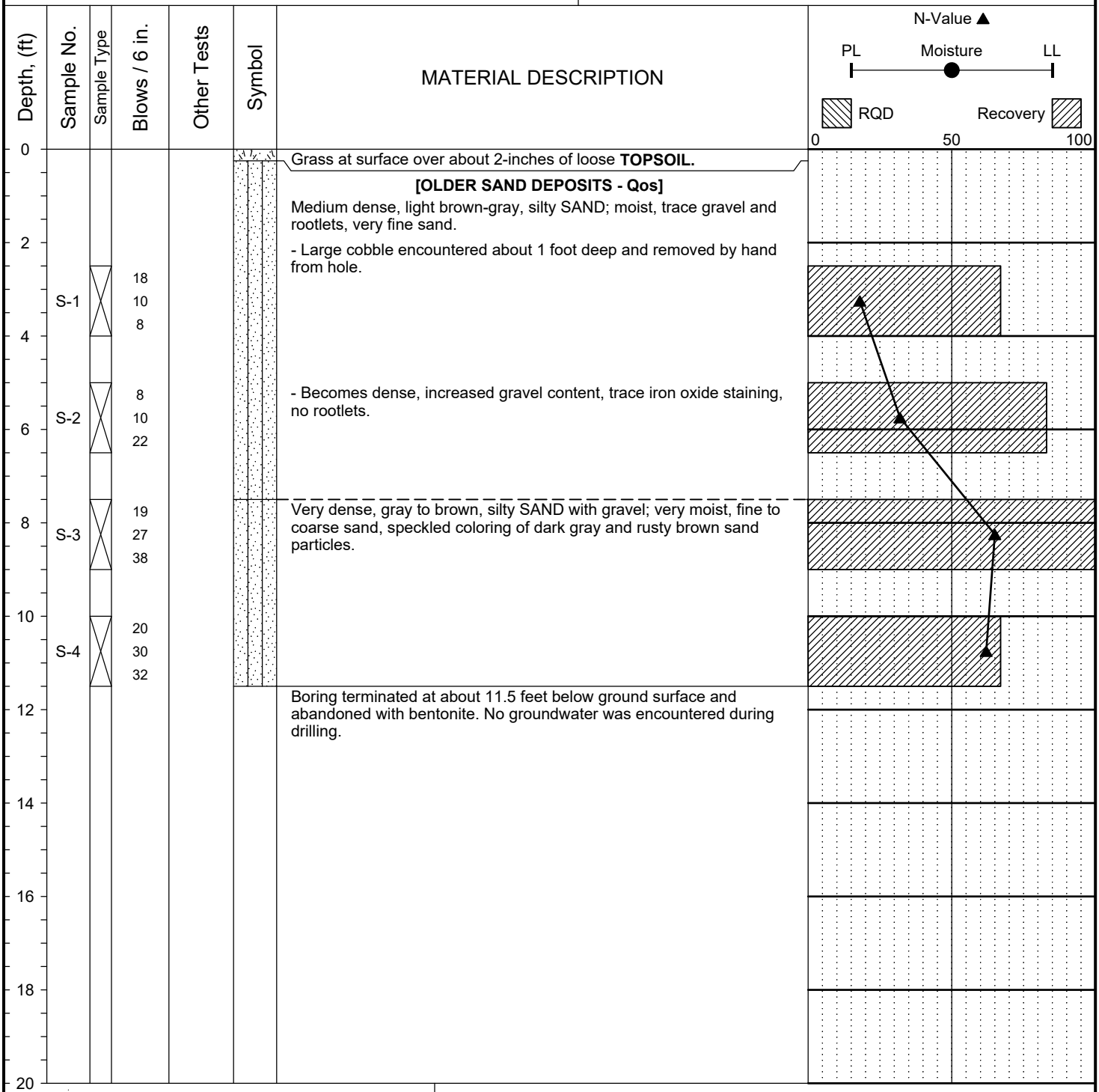
LOG OF TEST BORING PG-1

Figure A-2

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	Ludwig Residence	Surface Elevation:	Approx. El. 109'
Job Number:	22-219	Top of Casing Elev.:	N/A
Location:	9921 SE 16th Street, Bellevue, Washington	Drilling Method:	HSA, Mini Bobcat Track Rig
Coordinates:	Northing: , Easting:	Sampling Method:	SPT, Rope & Cathead



Completion Depth:	11.5ft
Date Borehole Started:	10/12/22
Date Borehole Completed:	10/12/22
Logged By:	A. Ong
Drilling Company:	Geologic Drill Partners, Inc.

Remarks: Standard penetration test (SPT) sampler driven with a 140 lb. safety hammer. Hammer operated with a rope and cathead mechanism. The elevations are approximated from the project topographic survey by Terrane, dated 12/15/2021, and measuring from known site features. This information is provided for relative information only and is not a substitution for field survey. **Datum: NAVD88**

PanGEO INCORPORATED

LOG OF TEST BORING PG-2

Figure A-3

The stratification lines represent approximate boundaries. The transition may be gradual.

Hand Boring Logs

Project No: 22-219
Project Name: Proposed Garage
Project Location: 9921 SE 16th Street, Bellevue, WA
Excavated: 5/20/2022

Hand Boring No. HB-1

Location: 47.596508, -122.2-7992 (WGS84)

Approximate ground surface elevation: 100 feet (NAVD88)

Depth (ft)	Material Description
0 – ⅓	Topsoil and forest duff: 4 inches thick
⅓ – 2	Medium dense to dense, light brown, silty SAND with gravel, moist **[Weathered Older Sand Deposits - Qos]**, occasional roots
2 – 2½	Dense to very dense, light brown, slightly silty SAND with gravel, moist **[Older Sand Deposits - Qos]** - Refusal at approximately 2½ feet

Image of soils encountered approximately 2 feet below the existing ground surface. Groundwater seepage was not observed during excavation.

Logged by: J. Manke

Hand Boring Logs

Project No: 22-219
Project Name: Proposed Garage
Project Location: 9921 SE 16th Street, Bellevue, WA
Excavated: 5/20/2022

Hand Boring No. HB-2

Location: 47.596258, -122.208422 (WGS84)

Approximate ground surface elevation: 108 feet (NAVD88) 47.596483, -122.207925

Depth (ft)	Material Description
0 – ¼	Grass and topsoil: 3 inches thick
¼ – 3½	Medium dense, light brown, silty SAND with trace gravel, moist **[Weathered Older Sand Deposits - Qos]**, occasional roots
3½ – 4	Dense to very dense, light brown, slightly silty SAND with gravel, moist **[Older Sand Deposits - Qos]** - Refusal at approximately 4 feet

Image of soils encountered approximately 2 feet below the existing ground surface. Groundwater was not encountered at the time of excavation.

Logged by: J. Manke

PanGEO INCORPORATED
Geotechnical & Earthquake Engineering Consultants

Figure A-5

Critical Areas Report

LUDWIG RESIDENCE

BELLEVUE, WA

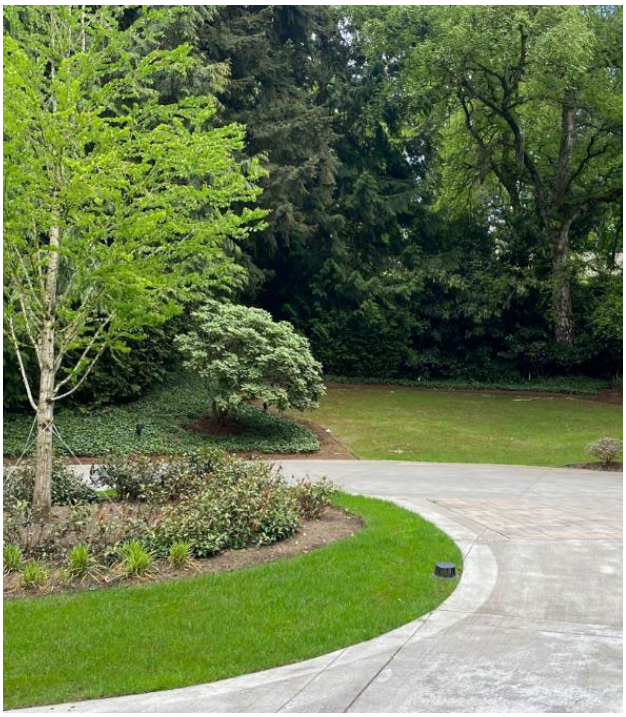
11/22/2022

Prepared for:

City of Bellevue
Development Services Department
450 110th Ave NE
Bellevue, WA 98005

Prepared on behalf of (applicant):

Cristi and John Ludwig
2223 112th Avenue NE, Ste 100
Bellevue, WA 98004



The Watershed Company

Title-page image: Front yard and landscaping at Ludwig Residence.

The information contained in this report is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria outlined in the methods section. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, state and federal regulatory authorities. No other warranty, expressed or implied, is made.

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, WA 98033

p 425.822.5242
f 425.827.8136

watershedco.com

Reference Number: 220918

Contact: David Jackson
Environmental Planner

Executive Summary

The purpose of this report is to document critical area and buffer impacts and mitigation measures associated with the proposed residential expansion project at 9921 SE 16th Street in Bellevue. The project includes the expansion of the home (Addition), a sport court, and an accessory dwelling unit (Guest Cottage). The project will be partially located in a steep slope buffer, and includes mitigation that will compensate for the impacts to the buffer and will result in a net improvement to the ecological condition of the site overall.

Table of Contents

1 Introduction

1.1 Background & Purpose

The project site is located at 9921 SE 16th Street in the City of Bellevue (parcel no. 0624059068). The property includes a regulated steep slope critical area and the proposed project impacts the buffer of the steep slope. Bellevue LUC 20.25H.145 requires a critical areas report for projects near steep slopes, and LUC 20.25H.250(B) determines appropriate criteria for a critical areas report. Additionally, LUC 20.25H.220 requires the submission of a mitigation plan if the project proposes any impacts to a critical area or buffer. This report fulfils those criteria, presenting a detailed discussion of existing conditions, critical area buffer impacts, and proposed mitigation measures.

1.2 Methods

A geotechnical report was compiled by PanGEO Inc. on July 28, 2022 following standard protocols by qualified professionals. The report is titled "Geotechnical Report – Revision 1: File No. 22-219". The report includes a detailed discussion regarding geotechnical compliance with specific provisions found in LUC 20.25H.125, LUC 20.25H.140, and LUC 20.25H.145.

The Watershed Company (Watershed) staff also visited the study area in person. On October 19, 2022, Ecologist Sam Payne and Environmental Planner David Jackson visited the project area to assess site conditions and gather mitigation and restoration plan information.

2 Environmental Setting

The project site is a 55,303 square foot lot in a residential area. A single-family home is situated on the west side of the parcel. A driveway and landscaping, including mature trees and slopes, are situated on the east side of the parcel. The site is located in the Cedar-Sammamish Basin within WRIA 8. Vegetation on site includes primarily invasive, and ornamental landscaping vegetation. The project site includes an area of regulated steep slope and corresponding buffers, and vegetation in the buffer is predominantly invasive species, including English ivy, laurel species, and holly. Public-domain information on the subject property was reviewed for this critical areas report. Resources and review findings are presented below in Table 1.

Table 1. Summary of online mapping and inventory resources.

Resource	Summary
WETS climatic condition	At the time of survey, the site conditions were slightly drier than normal for the season. It is unlikely that this affected survey results.
United States Department of Agriculture Natural Resources Conservation WE Web Soil S Service	The sites is predominately Kitsap silt loam, 15 to 30 percent slopes (KpD) according to USDA Web Soil Survey.
United States Fish and Wildlife Service: National Wetland Inventory Wetland Mapper	The NWA does not show any wetlands on the site.
Washington Department of Fish and Wildlife (WDFW): Priority Habitat Species (PHS) on the Web	There are not any priority species habitat on the site.
WDFW: SalmonScape	There are no salmon habitat or migration areas on or adjacent to the site.
Washington State (WA) Department of Natural Resources (DNR): Forest Practices Activity Mapping Tool	WA DNR does not map any forest practices on the site.
WA DNR: Wetlands of High Conservation Value (WHCV) Map Viewer	There are no wetlands of high conservation value on the site.
King County Public GIS (iMap)	King County iMap notes that the site is a potential erosion hazard. The map does not note any flooding, noxious weeds, or stormwater services on site.
City Maps	The City maps include steep slopes on the site and wildlife urban interface areas. The City maps also indicates that the soil type is Kitsap Silt Loam with 15-30 percent slopes, which is consistent with the USDA findings.

2.1 Vicinity Maps

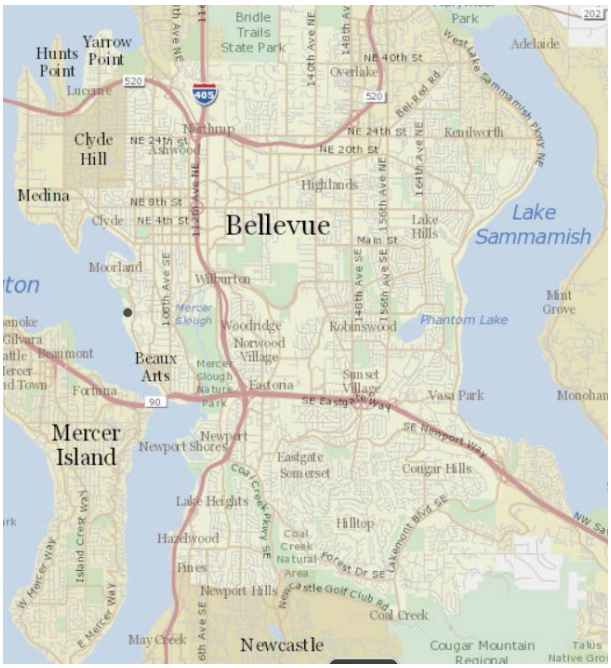


Figure 1. The black dot indicates the site's position in the City of Bellevue (King County, iMap).

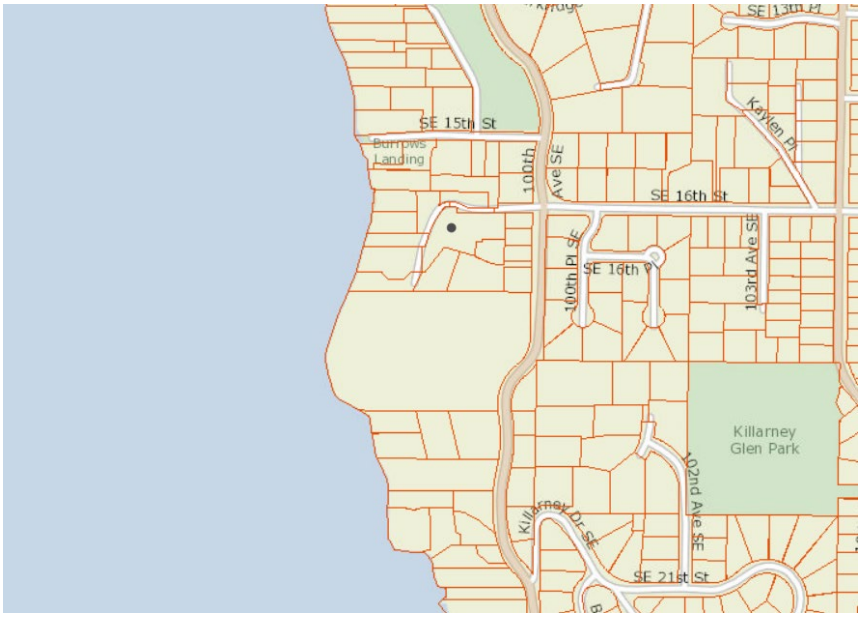


Figure 2. The black dot marks the parcel's location (King County, iMap).

Figure 3. The soil profile on-site (Web Soil Survey).

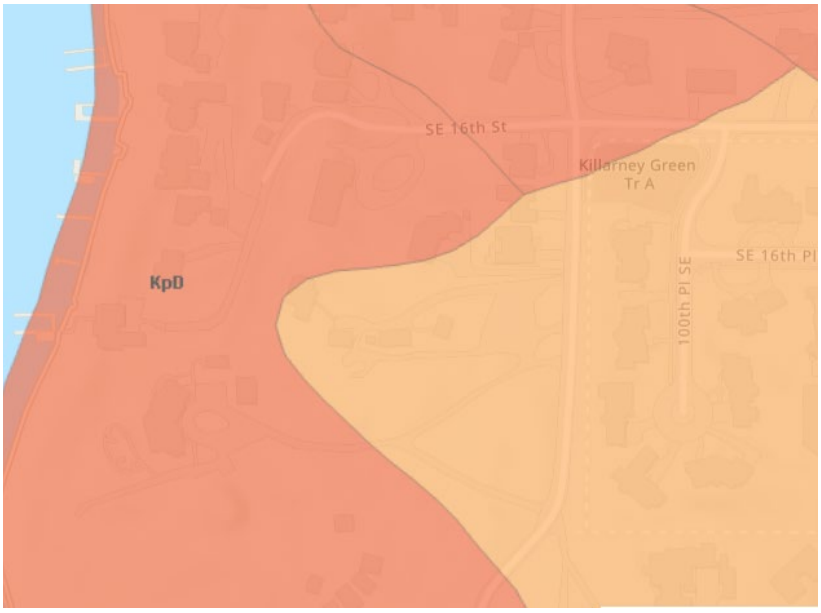


Figure 4. Soil types on site, from the City of Bellevue maps.

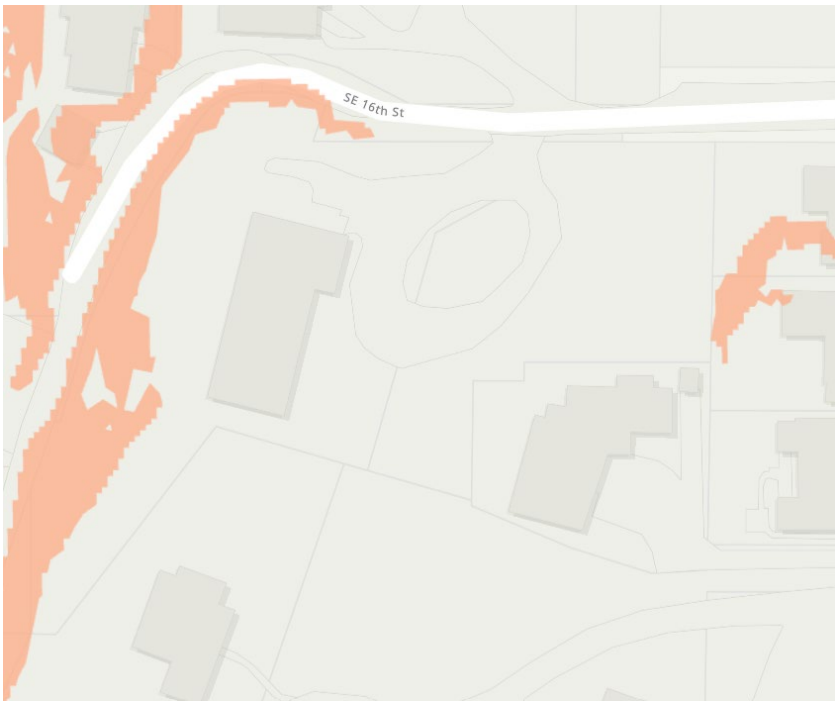


Figure 5. Steep slopes on-site from the City of Bellevue. Red indicates steep slope areas.

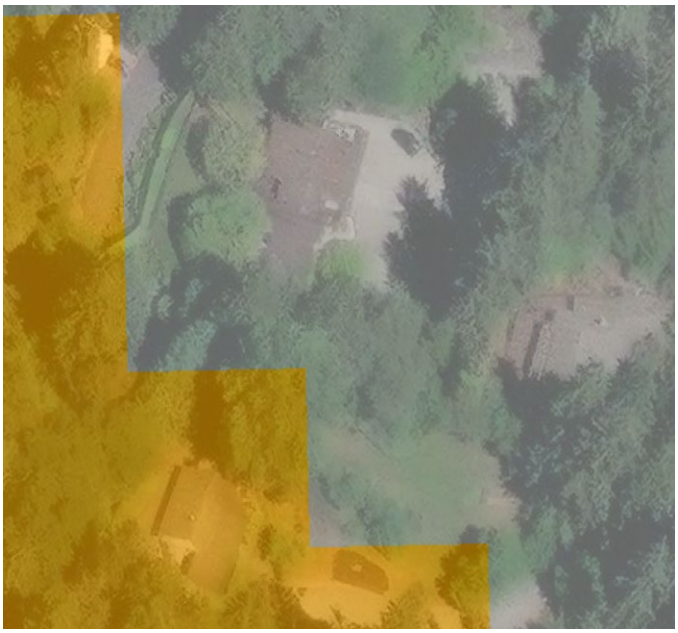


Figure 6. Wildlands-Urban Interface (WUI), “WUI-Intermix” on-site indicated in yellow.

2.2 Site Photos

Figure 7. View of the existing conditions on the south side of the house where the proposed addition is planned, facing west.

Figure 8. North-facing slope on the east side of the property at the location of the proposed Guest Cottage, facing west.

Figure 9. Existing lawn area near the southeast corner of the existing house and south side of the roundabout driveway at the proposed sport court location, facing south.

3 Critical Areas & Functions

As described above, PanGEO prepared the geotechnical survey for the project on July 28th, 2022. According to PanGEO there is one area of steep slope on the site. Steep slope features are described in Section 3.1 and wildlife habitat features are discussed in Section 3.2. Descriptions are taken from the geotechnical report and from the site visit by Watershed.

3.1 Steep Slope

The steep slope is located at the west edge of the parcel and extends along the entire edge and off-site. The slope is marked as a steep slope area by the City of Bellevue and PanGEO. The slope is indicated to exceed 40 percent and has an area greater than 1,000 square feet. It has a top-of-slope buffer of 50 feet, per the requirements in Bellevue LUC 20.25H.035(A). This slope is dominated by landscaping and ornamental vegetation, including laurel, and native vegetation, including rhododendron and Oregon grape.

3.2 Wildlife Presence

The site does not include significant priority species and habitat. The on-site slope may provide opportunities for habitat but is dominated by invasive vegetation which does not provide maximum habitat functions for local wildlife.

The southwest edge of the parcel, including the regulated steep slope area, is classified as "WUI-Intermix" by the Washington State Dept of Natural Resources. This designation indicates that structures and development are surrounded on two or more sides by wildlands and can be found in low-density urban areas. This may indicate that that the steep slope area has high potential for habitat improvements.

4 Project

4.1 Description

The project consists of the creation of a sport court adjacent to the current driveway, the creation of an ADU (Guest Cottage) on the eastern edge of the property, and the expansion of the existing primary residence to the south. The sport court is 30 by 60 feet with stairs to the north and additional access features around the perimeter. The total footprint of the sport court is estimated to be 8,721 square feet and will be located entirely outside of critical areas and buffers/setbacks.

The proposed Guest Cottage is estimated to be within a 945 square foot footprint. The Guest Cottage includes a garage on the ground floor, and a living space above the garage. Stairs for the Guest Cottage are situated on the south of the structure, and additional access pavement extends around the west and north of the structure. The Guest Cottage will be located entirely outside of critical areas and buffers/setbacks.

The extension of the house expands the footprint of the existing structure by 262 square feet in the southwest corner of the home. This expansion will be located partially within the 50-foot buffer of the on-site regulated steep slope, with permanent buffer impacts totaling 154 square feet. Temporary construction impacts are expected to impact an additional 270 square feet of buffer temporarily.

4.2 Impacts

The project has been designed to avoid and minimize direct impacts to the steep slope and its potential wildlife habitat. The proposed residential addition will include the removal of vegetation and grading within portions of a steep slope buffer. Construction is likely to have additional temporary impacts. These activities have the potential to cause erosion and reduce the habitat functions of the buffer. Replanting vegetation within the slope and buffer will mitigate these impacts and potentially improve their functions.

4.3 Construction Details

4.3.1 Construction Sequence

The following implementation sequence provides a description of the construction, including methods and equipment to be used.

1) Identify and mark work limits with high visibility fencing.
2) Identify and protect all utilities that may exist in the construction area.
3) Install a silt fence along project construction limits.
4) Excavate soils where indicated per the plans.
5) Remove excavated soils and other spoils from the site
6) Backfill with appropriate soils where indicated, per the plans.
7) Install native plantings during the first dormant season (November through March) or as directed by the project representative. Use sizing and condition information provided in the planting schedule. If plants are installed outside of the dormant season, then a minimum of two inches of water per week should be provided during the first summer.
8) Survival in a healthy condition is to be guaranteed by the landscape contractor for all of the planted specimens through their entire first growing season. An acceptance inspection by the project representative or project Landscape Architect is to be made during the period of September 15 through October 15 following the initial dormant season planting (6-10 months later) and any dead, missing, or unhealthy specimens are to be replaced. Replacement is to occur during the then-upcoming dormant

season. Plants are to be replaced per plant schedule specifications in the plan documents.

9) Plantings are to be monitored and maintained ensure successful enhancement of the steep slope and buffer area. Species goals and performance standards can be found in Appendix B. If performance standards are met at the end of the monitoring period, the site will then be deemed successful.

Further Information:

- Equipment will be maintained in proper working order.
- Staging and stockpiling will occur in designated areas outside of the slope or buffers.
- Materials will be permanently disposed of off-site.

4.3.2 Grading and Excavation

Excavation will occur as follows:

- Light tracked excavators and/or skid steer access the site though the driveway and the road to the north.
- Grading will alter the exiting grade to the degree indicated in the plans. Fill to achieve the desired grade will be installed manually or with machines per the plans.
- The spoils will be stockpiled outside of the slopes or buffers and disposed off-site.
- Appropriate topsoil will be added to a depth of no more than 4 inches to areas graded or temporarily impacted by construction.

4.3.3 Mitigation Plantings

1. Manually clear invasive and ornamental vegetation from mitigation area during spring and/or summer months (i.e., avoid creating exposed soil conditions during the winter storm season).
   A. Remove invasive species (i.e., creeping buttercup, English ivy), in accordance with King County noxious weed best management practices. For more information: https://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds.aspx.
   B. Within approximately five feet of property boundary, cut undesirable vegetation. Leave roots intact to minimize potential impacts to slopes on adjacent properties.
   C. Flush-cut ornamental woody vegetation (e.g. laurel, non-native apple or plum) throughout mitigation area and immediately treat stem (daubing or painting) with appropriate herbicide. Person applying herbicide shall be state-licensed. Do not remove subsurface roots.
   D. Avoid and minimize disturbance and/or compaction to roots of established native trees to be retained when removing vegetation from within tree driplines.

2. Install coir on cleared steep slope mitigation areas per plan detail.
3. Blanket-mulch cleared areas including steep slopes with wood mulch, four inches thick.
   A. Ensure mulch does not touch stems of existing (or installed) vegetation.

5 Mitigation

Mitigation for slope and buffer impacts is achieved through enhancement to the steep slope buffer adjacent to the project area. Permanent buffer impacts total approximately 154 square feet and temporary impacts total approximately 270 square feet. The proposed mitigation is 1,000 square feet, which exceeds the required ratio of 1:1 by Bellevue LUC 20.25H.085(B). Plantings in this area will enhance the steep slope and buffer and significantly improve their function. Additionally, wildlife friendly plants will provide additional functions in and adjacent to the wildlife interface mapped by the City. The plant list used to achieve this is covered in detail in Section 5.3 and Appendix A.

5.1 Mitigation Goals

1. Preserve slope stability by installing native vegetation that will retain the steep slopes and prevent erosion in the buffer. Native vegetation prevents erosion through root systems adapted to local soil types and weather regimes.
2. Preserve habitat by increasing the amount of native vegetation supporting habitat functions in steep slope buffer and in the Wildlands Urban Interface. The proposed mitigation plan removes invasive and non-native species and replaces them with native plant communities. Native plant communities offer improved services for habitat, since native fauna are adapted to use the resources provided by those species.
3. Improve the ecosystem services on the site by enhancing the steep slope buffer. Proposed enhancement is centered around reduction of invasive species and increasing the total coverage of native species. Additionally, improving species richness, the diversity and number of species, is important to improving all aspects of ecological function in the critical area and buffer.

5.2 Mitigation Sequence

Per Bellevue LUC 20.25H.215, all projects must adhere to specific mitigation sequencing. A lower priority measure will only be applied if a higher priority is infeasible or inapplicable.

A. Avoiding the impact altogether by not taking a certain action or parts of an action;

B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;

C. Performing the following types of mitigation (listed in order of preference):

1. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

2. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or

3. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments;

D. Monitoring the hazard or other required mitigation and taking remedial action when necessary.

Mitigation for individual actions may include a combination of the above measures, per LUC 20.25.H.215. This project satisfies mitigation sequencing by using step A through C. It avoids impacts by carefully placing the project to avoid impacts on critical areas. Specifically, the addition uses an existing walkway, an area that has already been developed as an impervious surface and graded as part of the initial construction of the home. Relocating the expansion would likely increase the amount of impervious surface outside of the house's existing footprint and require additional grading and filling. It minimizes impacts by employing best practices (BMPs) in siting and construction to cause as little disruption as is feasible. Further, the construction uses temporary erosion and sediment controls (TESC) such as straw waddles and silt fences to aid slope retention and control stormwater, and sediment. If necessary, additional BMPs to reduce construction impacts will be employed to reduce erosion that may otherwise harm or degrade the steep slope area and its buffer. The project finally repairs and restores impacts to the site caused by the project, resulting in a functional lift to the ecosystem functions provided by the site.

5.3 Cumulative Effects

Continued development and loss of habitat potentially increases impacts on critical area functions due to increased fragmentation and disturbance. Additionally, impacts to steep slope areas and their buffers can lead to destabilization and geological hazards over time. Invasive plants provide some benefit to ecological function but are less effective than native plant communities. Therefore, this project proposes to reinstate a native plant community and improve functions of the restored and enhanced habitat by planting diverse vegetation, removing invasive species, and improving the slope retention and erosion control.

Overall, the cumulative impacts to urban habitat from relatively small areas of disturbance, like this one, is expected to be minor. The majority of the surrounding area has already been developed and is unlikely to substantially change in the foreseeable future. However, since small changes in the surrounding area can result in a compounding effect, the mitigation of

degraded habitat is proposed to enhance and reestablish ecological functions to the critical areas and their buffers.

5.4 Planting Plan

Specific plants were chosen for inclusion in the steep slope buffer mitigation plan based on their ability to retain slope stability, their benefit to habitat functions, and being native to the Pacific Northwest. Since the proposed mitigation area is associated with the Urban Wildlands Interface, and the homeowner has reported deer often frequenting the area, the species are also mixed with species may be protected from browsing by local deer and increase their odds of survival. The plant choices, quantities, and placement notes are presented in Table 3 below.

Table 3. Mitigation Plant List

Common Name	Botanical Name	Quantity	Spacing	Size	Placement Notes
Tall Oregon Grape	*Berberis aquifolium*	10	3' Center	2 gal	In shade
Black Twinberry	*Lonicera involucrata*	4	3' Center	1 gal	Edge of site
Oso Berry	*Oemleria cerasiformis*	4	3' Center	1 gal	Higher up on slope
Red-flowering Currant	*Ribes sanguineum*	8	3' Center	1 gal	
Salmonberry	*Rubus spectabilis*	10	3' Center	1 gal	Lower on the slope
Snowberry	*Symphoricarpos albus*	10	3' Center	2 gal	Space evenly
Evergreen Huckleberry	*Vaccinium ovatum*	8	1' center	4"	Place closely around trees
Red Huckleberry	*Vaccinium parvifolium*	6	3' Center	1 gal	
Bleeding Heart	*Dicentra formosa*	24	3’ Center	4"	Deeper shade is better
Kinnikinnick	*Arctostaphylos uva-ursi*	22	18” Center	4”	Stagger on slope
Coastal Strawberry	*Fragaria chiloensis*	18	3’ Center	4"	Less shade is better
Big-leaf Avens	*Geum macrophyllum*	36	5’ Center	4"	
Twinflower	*Linnaea borealis*	16	5’ Center	4"	Place higher up on slope

5.5 Functional Lift Analysis

Based on the proposed mitigation plan described above, no-net-loss of ecological functions is anticipated. Considering the current conditions of the steep slope and buffer, the permanent impacts will be offset by the proposed mitigation, and the temporary impacts will be minimal.

Table 4. Functional Lift Analysis

	Existing Conditions	Proposed Change	Proposed Result
Habitat	Mix of native and invasive species provide some habitat functions for local fauna.	Remove invasive and landscaping species and replace with native species with improved habitat benefits.	Habitat availability and services are improved by the increase of native plants to which local fauna are adapted.
Slope Retention	Mix of native and invasive or landscaping plant species provide some benefit to slope retention.	Remove invasive and landscaping species and replace with native species with slope and soil retaining properties.	Slope and soil are better retained by native plants adapted to local soil and weather regimes.
Native Plant Richness	Mix of native and invasive plants provide some diversity and resilience.	Remove invasive and landscaping species and replace with native species in increased diversity and quantity.	The improved richness will lead to better habitat functions, slope retention, and overall improved resilience of the slope and buffer.

5.6 Maintenance and Monitoring

A comprehensive maintenance and monitoring plan can also be found in Appendix A.

5.6.1 Monitoring

This monitoring program is designed to track the success of the mitigation site over time and to measure the degree to which the site is meeting the performance standards outlined in the preceding section.

An as-built plan will be prepared by the restoration professional prior to the beginning of the monitoring period. The as-built plan will be a mark-up of the planting plans included in this plan set. The as-built plan will document any departures in plant placement or other components from the proposed plan.

Monitoring will take place once annually in the fall for five years. Year-1 monitoring will commence in the first fall subsequent to installation.

The formal monitoring visit shall record and report the following in an annual report submitted to the City of Bellevue:

1. Visual assessment of the overall site.
2. Year-1 counts of live and dead plants by species. Year-2 through Year-5 counts of established native trees and shrubs by species, to the extent feasible.
3. Counts of dead plants where mortality is significant in any monitoring year.
4. Estimate of native cover in the mitigation area.
5. Estimate of non-native, invasive weed cover in the mitigation area.
6. Tabulation of established native species, including both planted and volunteer species.
7. Photographic documentation from at least three fixed reference points.
8. Any intrusions into or clearing of the planting areas, vandalism, or other actions that impair the intended functions of the mitigation area.
9. Recommendations for maintenance or repair of any portion of the mitigation area.

5.6.2 Maintenance

The site will be maintained in accordance with the following instructions for at least five years following completion of construction:

1. Follow the recommendations noted in the previous monitoring site visit.
2. General weeding for all planted areas:
3. At least twice yearly, remove all competing weeds and weed roots from beneath each installed plant and any desirable volunteer vegetation to a distance of 18 inches from the main plant stem. Weeding should occur at least twice during the spring and summer. Frequent weeding will result in lower mortality, lower plant replacement costs, and increased likelihood that the plan meets performance standards by Year 5.
4. More frequent weeding may be necessary depending on weed conditions that develop after plant installation.
5. Do not weed the area near the plant bases with string trimmer (weed whacker/weed eater). Native plants are easily damaged or killed, and weeds easily recover after trimming.
6. Selective applications of herbicide may be needed to control invasive weeds, especially when intermixed with native species. Herbicide application, when necessary, shall be conducted only by a state-licensed applicator.

7. Apply slow-release, granular fertilizer to each installed plant annually in the spring (by June 1) of Years 2 through 5.
8. Replace mulch as necessary to maintain a 4-inch-thick layer, retain soil moisture, and limit weeds.
9. Replace each plant found dead in the summer monitoring visits during the upcoming dormant season (October 15 to March 1), for best survival.
10. The property owner will ensure that water is provided for the entire planted area with a minimum of 1 inch of water per week from June 1 through September 30 for the first two years following installation, through the operation of a temporary irrigation system. Less water is needed during March, April, May and October.

5.6.3 Evaluation Criteria

1. Plant survival
    a. Less than 50% mortality in Years 1-2
    b. Less than 20% mortality in Years 3-5
2. Native species coverage
    a. Greater than 50% native species coverage in Year 1
    b. Greater than 80% native species coverage in Years 2-5
3. Invasive species coverage
    a. Less than 50% invasive species coverage in Year 1
    b. Less than 20% invasive species coverage in Years 2-5

5.6.4 Contingencies

If there is a significant problem with the restoration area meeting performance standards, a contingency plan will be developed and implemented. Contingency plans can include, but are not limited to: soil amendment, additional plant installation, and plant substitutions of type, size, quantity, and location.

6 Conclusion

The project will result in temporary and permanent impacts to the buffer of a steep slope critical area, and the proposed mitigation will improve the overall health and functions of the slope and buffer in the long term. Replacing invasive and ornamental vegetation with native vegetation will improve critical functions for habitat, slope retention, and species richness. The impacts of the project will be minimal, and the long-term benefits will be significant. Overall, a net gain in critical area and buffer functions will result from the proposed project. This report

satisfies the requirements specified in Bellevue LUC 20.25H.220 and includes all elements required by LUC 20.25H.250.

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Appendix A

MITIGATION PLAN

VICINITY MAPS

LEGEND

- Steep Slope
- Steep Slope Buffer (50 FT)
- Parcel Boundaries

NOTES

1. CRITICAL AREAS DELINEATED BY PANGEO JULY 28, 2022.

2. PLACEMENT APPROXIMATED FROM SURVEY DATA. FOR PERMITTING NOT CONSTRUCTION.

0 20 40 80 Feet

THE WATERSHED COMPANY
SCIENCE & DESIGN

750 6TH STREET SOUTH
KIRKLAND WA 98033

425.822.5242
WWW.WATERSHEDCO.COM

PROJECT:
LUDWIG EXPANSION MITIGATION PLAN

9221 SE 16TH STREET
BELLEVUE, WA 98004

PRINCIPAL:
PM: JKB
DRAWN BY: DJ

CHECKED BY: JKB
JOB NO.: 210918
DATE: 11/22/2022

REVISIONS

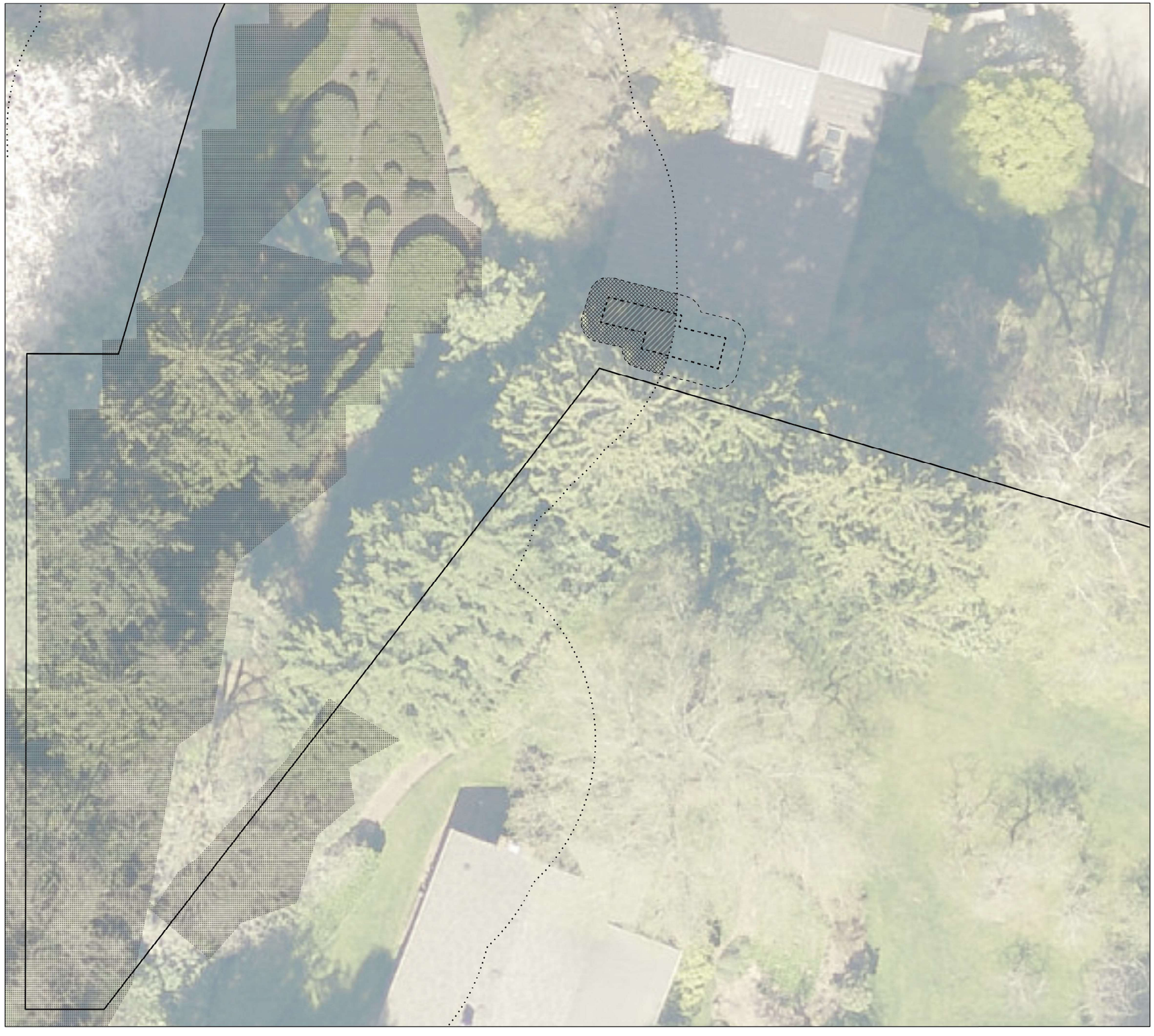
NO.	DESCRIPTION	DATE

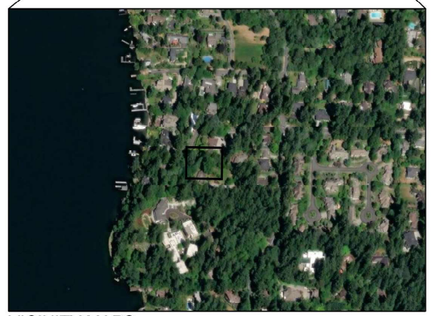
NOT FOR CONSTRUCTION

PERMIT LEVEL DESIGN

11/22/2022

EXISTING CONDITIONS





VICINITY MAPS

LEGEND

- New Addition
- New Addition Permanent Impacts (154 SF)
- New Addition Construction Footprint (5 FT)
- New Addition Temporary Impacts (270 SF)
- Steep Slope
- Steep Slope Buffer (50 FT)
- Parcel Boundaries

NOTES

1. CRITICAL AREAS DELINEATED BY PANGEO JULY 28, 2022.

2. PLACEMENT APPROXIMATED FROM SURVEY DATA. FOR PERMITTING NOT CONSTRUCTION.

0 10 20 40 Feet

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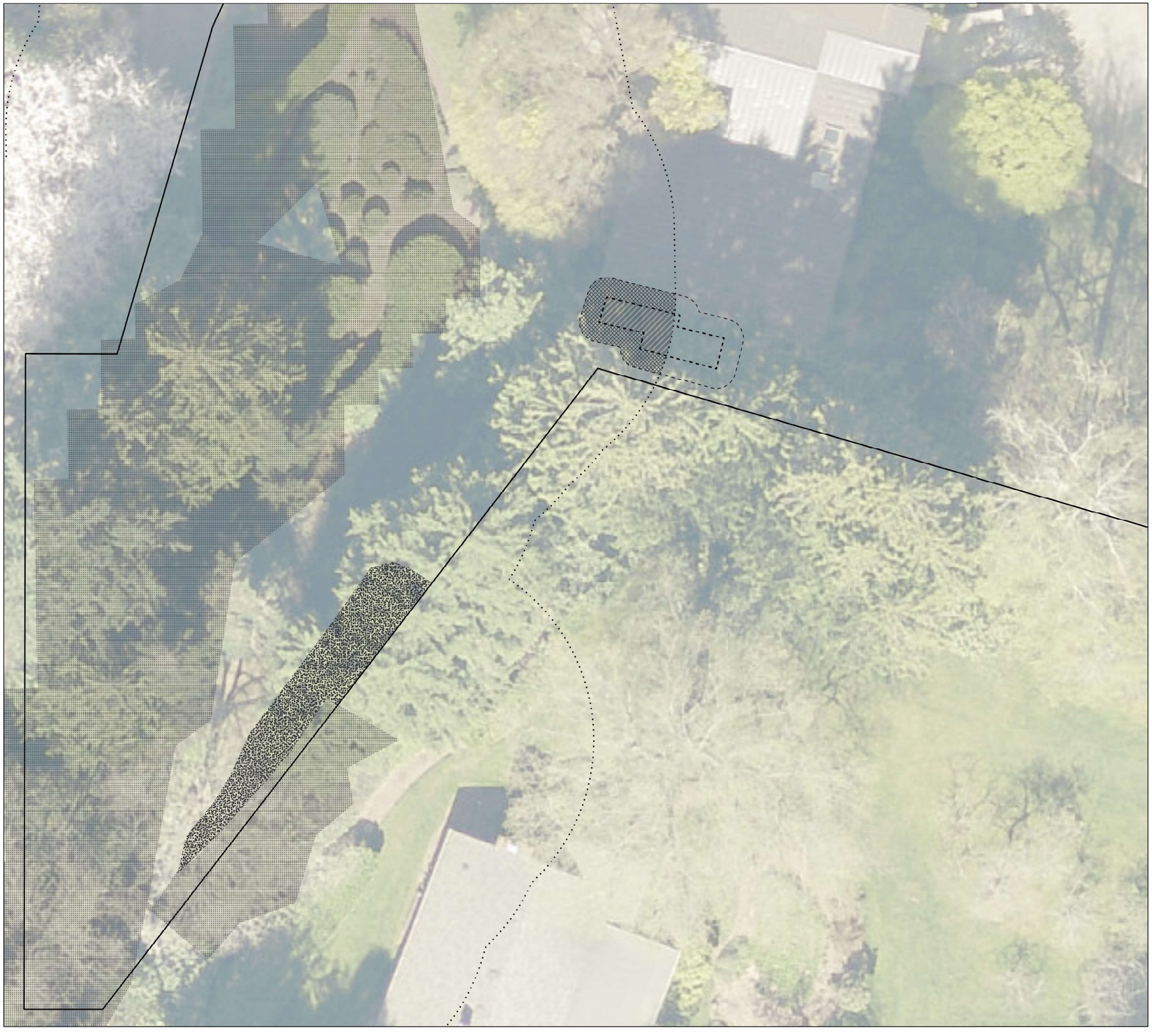
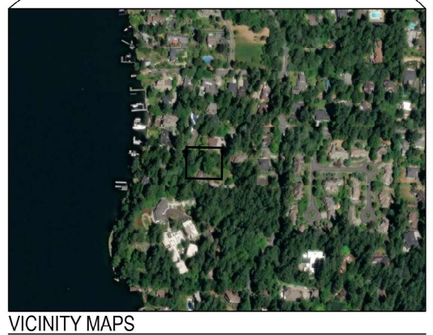
NOT FOR CONSTRUCTION

PERMIT LEVEL DESIGN

11/22/2022

IMPACTS PLAN





VICINITY MAPS

LEGEND

- Proposed Mitigation (1,000 SF)
- New Addition
- New Addition Permanent Impacts (154 SF)
- New Addition Construction Footprint (5 FT)
- New Addition Temporary Impacts (270 SF)
- Steep Slope
- Steep Slope Buffer (50 FT)
- Parcel Boundaries

NOTES

1. CRITICAL AREAS DELINEATED BY PANGEO JULY 28, 2022.

2. PLACEMENT APPROXIMATED FROM SURVEY DATA. FOR PERMITTING NOT CONSTRUCTION.

3. SEE SHEET 4 FOR PLANT SCHEDULE.

0 10 20 40 Feet

THE WATERSHED COMPANY
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REVISIONS

NO.	DESCRIPTION	DATE

NOT FOR CONSTRUCTION

PERMIT LEVEL DESIGN

11/22/2022

MITIGATION PLAN

MITIGATION PLAN

CONSTRUCTION SEQUENCE

THE FOLLOWING IMPLEMENTATION SEQUENCE PROVIDES A DESCRIPTION OF THE CONSTRUCTION, INCLUDING METHODS AND EQUIPMENT TO BE USED.

1. IDENTIFY AND MARK WORK LIMITS WITH HIGH VISIBILITY FENCING.
2. IDENTIFY AND PROTECT ALL UTILITIES THAT MAY EXIST IN THE CONSTRUCTION AREA.
3. INSTALL A SILT FENCE ALONG PROJECT CONSTRUCTION LIMITS.
4. EXCAVATE SOILS WHERE INDICATED PER THE PLANS.
5. REMOVE EXCAVATED SOILS AND OTHER SPOILS FROM THE SITE
6. BACKFILL WITH APPROPRIATE SOILS WHERE INDICATED, PER THE PLANS.
7. INSTALL NATIVE PLANTINGS DURING THE FIRST DORMANT SEASON (NOVEMBER THROUGH MARCH) OR AS DIRECTED BY THE PROJECT REPRESENTATIVE. USE SIZING AND CONDITION INFORMATION PROVIDED IN THE PLANTING SCHEDULE. IF PLANTS ARE INSTALLED OUTSIDE OF THE DORMANT SEASON, THEN A MINIMUM OF TWO INCHES OF WATER PER WEEK SHOULD BE PROVIDED DURING THE FIRST SUMMER.
8. SURVIVAL IN A HEALTHY CONDITION IS TO BE GUARANTEED BY THE LANDSCAPE CONTRACTOR FOR ALL OF THE PLANTED SPECIMENS THROUGH THEIR ENTIRE FIRST GROWING SEASON. AN ACCEPTANCE INSPECTION BY THE PROJECT REPRESENTATIVE OR PROJECT LANDSCAPE ARCHITECT IS TO BE MADE DURING THE PERIOD OF SEPTEMBER 15 THROUGH OCTOBER 15 FOLLOWING THE INITIAL DORMANT SEASON PLANTING (6-10 MONTHS LATER) AND ANY DEAD, MISSING, OR UNHEALTHY SPECIMENS ARE TO BE REPLACED. REPLACEMENT IS TO OCCUR DURING THE THEN-UPCOMING DORMANT SEASON. PLANTS ARE TO BE REPLACED PER PLANT SCHEDULE SPECIFICATIONS IN THE PLAN DOCUMENTS.
9. PLANTINGS ARE TO BE MONITORED AND MAINTAINED ENSURE SUCCESSFUL ENHANCEMENT OF THE STEEP SLOPE AND BUFFER AREA. SPECIES GOALS AND PERFORMANCE STANDARDS CAN BE FOUND IN APPENDIX B. IF PERFORMANCE STANDARDS ARE MET AT THE END OF THE MONITORING PERIOD, THE SITE WILL THEN BE DEEMED SUCCESSFUL.

FURTHER INFORMATION

- EQUIPMENT WILL BE MAINTAINED IN PROPER WORKING ORDER.
- STAGING AND STOCKPILING WILL OCCUR IN DESIGNATED AREAS OUTSIDE OF THE SLOPE OR BUFFERS.
- MATERIALS WILL BE PERMANENTLY DISPOSED OF OFF-SITE.

GRADING AND EXCAVATION

EXCAVATION WILL OCCUR AS FOLLOWS:

- LIGHT TRACKED EXCAVATORS AND/OR SKID STEER ACCESS THE SITE THOUGH THE DRIVEWAY AND THE ROAD TO THE NORTH.
- GRADING WILL ALTER THE EXITING GRADE TO THE DEGREE INDICATED IN THE PLANS. FILL TO ACHIEVE THE DESIRED GRADE WILL BE INSTALLED MANUALLY OR WITH MACHINES PER THE PLANS.
- THE SPOILS WILL BE STOCKPILED OUTSIDE OF THE SLOPES OR BUFFERS AND DISPOSED OFF-SITE.
- APPROPRIATE TOPSOIL WILL BE ADDED TO A DEPTH OF NO MORE THAN 4 INCHES TO AREAS GRADED OR TEMPORARILY IMPACTED BY CONSTRUCTION.

MITIGATION PLANTINGS

1. MANUALLY CLEAR INVASIVE AND ORNAMENTAL VEGETATION FROM MITIGATION AREA DURING SPRING AND/OR SUMMER MONTHS (I.E., AVOID CREATING EXPOSED SOIL CONDITIONS DURING THE WINTER STORM SEASON).
   A. REMOVE INVASIVE SPECIES (I.E., CREEPING BUTTERCUP, ENGLISH IVY), IN ACCORDANCE WITH KING COUNTY NOXIOUS WEED BEST MANAGEMENT PRACTICES. FOR MORE INFORMATION: HTTPS://WWW.KINGCOUNTY.GOV/SERVICES/ENVIRONMENT/ANIMALS-AND-PLANTS/NOXIOUS-WEEDS.ASPX.
   B. WITHIN APPROXIMATELY FIVE FEET OF PROPERTY BOUNDARY, CUT UNDESIRABLE VEGETATION. LEAVE ROOTS INTACT TO MINIMIZE POTENTIAL IMPACTS TO SLOPES ON ADJACENT PROPERTIES.
   C. FLUSH-CUT ORNAMENTAL WOODY VEGETATION (E.G. LAUREL, NON-NATIVE APPLE OR PLUM) THROUGHOUT MITIGATION AREA AND IMMEDIATELY TREAT STEM (DAUBING OR PAINTING) WITH APPROPRIATE HERBICIDE. PERSON APPLYING HERBICIDE SHALL BE STATE-LICENSED. DO NOT REMOVE SUBSURFACE ROOTS.
   D. AVOID AND MINIMIZE DISTURBANCE AND/OR COMPACTION TO ROOTS OF ESTABLISHED NATIVE TREES TO BE RETAINED WHEN REMOVING VEGETATION FROM WITHIN TREE DRIPLINES.
2. INSTALL COIR ON CLEARED STEEP SLOPE MITIGATION AREAS PER PLAN DETAIL.
3. BLANKET-MULCH CLEARED AREAS INCLUDING STEEP SLOPES WITH WOOD MULCH, FOUR INCHES THICK.
   A. ENSURE MULCH DOES NOT TOUCH STEMS OF EXISTING (OR INSTALLED) VEGETATION.

MAINTENANCE AND MONITORING

A COMPREHENSIVE MAINTENANCE AND MONITORING PLAN CAN ALSO BE FOUND IN APPENDIX A.

MONITORING

THIS MONITORING PROGRAM IS DESIGNED TO TRACK THE SUCCESS OF THE MITIGATION SITE OVER TIME AND TO MEASURE THE DEGREE TO WHICH THE SITE IS MEETING THE PERFORMANCE STANDARDS OUTLINED IN THE PRECEDING SECTION.

AN AS-BUILT PLAN WILL BE PREPARED BY THE RESTORATION PROFESSIONAL PRIOR TO THE BEGINNING OF THE MONITORING PERIOD. THE AS-BUILT PLAN WILL BE A MARK-UP OF THE PLANTING PLANS INCLUDED IN THIS PLAN SET. THE AS-BUILT PLAN WILL DOCUMENT ANY DEPARTURES IN PLANT PLACEMENT OR OTHER COMPONENTS FROM THE PROPOSED PLAN.

MONITORING WILL TAKE PLACE ONCE ANNUALLY IN THE FALL FOR FIVE YEARS. YEAR-1 MONITORING WILL COMMENCE IN THE FIRST FALL SUBSEQUENT TO INSTALLATION.

THE FORMAL MONITORING VISIT SHALL RECORD AND REPORT THE FOLLOWING IN AN ANNUAL REPORT SUBMITTED TO THE CITY OF BELLEVUE:

1. VISUAL ASSESSMENT OF THE OVERALL SITE.
2. YEAR-1 COUNTS OF LIVE AND DEAD PLANTS BY SPECIES. YEAR-2 THROUGH YEAR-5 COUNTS OF ESTABLISHED NATIVE TREES AND SHRUBS BY SPECIES, TO THE EXTENT FEASIBLE.
3. COUNTS OF DEAD PLANTS WHERE MORTALITY IS SIGNIFICANT IN ANY MONITORING YEAR.
4. ESTIMATE OF NATIVE COVER IN THE MITIGATION AREA.
5. ESTIMATE OF NON-NATIVE, INVASIVE WEED COVER IN THE MITIGATION AREA.
6. TABULATION OF ESTABLISHED NATIVE SPECIES, INCLUDING BOTH PLANTED AND VOLUNTEER SPECIES.
7. PHOTOGRAPHIC DOCUMENTATION FROM AT LEAST THREE FIXED REFERENCE POINTS.
8. ANY INTRUSIONS INTO OR CLEARING OF THE PLANTING AREAS, VANDALISM, OR OTHER ACTIONS THAT IMPAIR THE INTENDED FUNCTIONS OF THE MITIGATION AREA.
9. RECOMMENDATIONS FOR MAINTENANCE OR REPAIR OF ANY PORTION OF THE MITIGATION AREA.

MAINTENANCE

THE SITE WILL BE MAINTAINED IN ACCORDANCE WITH THE FOLLOWING INSTRUCTIONS FOR AT LEAST FIVE YEARS FOLLOWING COMPLETION OF CONSTRUCTION:

1. FOLLOW THE RECOMMENDATIONS NOTED IN THE PREVIOUS MONITORING SITE VISIT.
2. GENERAL WEEDING FOR ALL PLANTED AREAS:
3. AT LEAST TWICE YEARLY, REMOVE ALL COMPETING WEEDS AND WEED ROOTS FROM BENEATH EACH INSTALLED PLANT AND ANY DESIRABLE VOLUNTEER VEGETATION TO A DISTANCE OF 18 INCHES FROM THE MAIN PLANT STEM. WEEDING SHOULD OCCUR AT LEAST TWICE DURING THE SPRING AND SUMMER. FREQUENT WEEDING WILL RESULT IN LOWER MORTALITY, LOWER PLANT REPLACEMENT COSTS, AND INCREASED LIKELIHOOD THAT THE PLAN MEETS PERFORMANCE STANDARDS BY YEAR 5.
4. MORE FREQUENT WEEDING MAY BE NECESSARY DEPENDING ON WEED CONDITIONS THAT DEVELOP AFTER PLANT INSTALLATION.
5. DO NOT WEED THE AREA NEAR THE PLANT BASES WITH STRING TRIMMER (WEED WHACKER/WEED EATER). NATIVE PLANTS ARE EASILY DAMAGED OR KILLED, AND WEEDS EASILY RECOVER AFTER TRIMMING.
6. SELECTIVE APPLICATIONS OF HERBICIDE MAY BE NEEDED TO CONTROL INVASIVE WEEDS, ESPECIALLY WHEN INTERMIXED WITH NATIVE SPECIES. HERBICIDE APPLICATION, WHEN NECESSARY, SHALL BE CONDUCTED ONLY BY A STATE-LICENSED APPLICATOR.
7. APPLY SLOW-RELEASE, GRANULAR FERTILIZER TO EACH INSTALLED PLANT ANNUALLY IN THE SPRING (BY JUNE 1) OF YEARS 2 THROUGH 5.
8. REPLACE MULCH AS NECESSARY TO MAINTAIN A 4-INCH-THICK LAYER, RETAIN SOIL MOISTURE, AND LIMIT WEEDS.
9. REPLACE EACH PLANT FOUND DEAD IN THE SUMMER MONITORING VISITS DURING THE UPCOMING DORMANT SEASON (OCTOBER 15 TO MARCH 1), FOR BEST SURVIVAL.
10. THE PROPERTY OWNER WILL ENSURE THAT WATER IS PROVIDED FOR THE ENTIRE PLANTED AREA WITH A MINIMUM OF 1 INCH OF WATER PER WEEK FROM JUNE 1 THROUGH SEPTEMBER 30 FOR THE FIRST TWO YEARS FOLLOWING INSTALLATION, THROUGH THE OPERATION OF A TEMPORARY IRRIGATION SYSTEM. LESS WATER IS NEEDED DURING MARCH, APRIL, MAY AND OCTOBER.

EVALUATION CRITERIA

1. PLANT SURVIVAL
   A. LESS THAN 50% MORTALITY IN YEARS 1-2
   B. LESS THAN 20% MORTALITY IN YEARS 3-5
2. NATIVE SPECIES COVERAGE
   A. GREATER THAN 50% NATIVE SPECIES COVERAGE IN YEAR 1
   B. GREATER THAN 80% NATIVE SPECIES COVERAGE IN YEARS 2-5
3. INVASIVE SPECIES COVERAGE
   A. LESS THAN 50% INVASIVE SPECIES COVERAGE IN YEAR 1
   B. LESS THAN 20% INVASIVE SPECIES COVERAGE IN YEARS 2-5

Common Name	Botanical Name	Quantity	Spacing	Size	Placement Notes
Tall Oregon Grape	*Berberis aquifolium*	10	3' Center	2 gal	In shade
Black Twinberry	*Lonicera involucrata*	4	3' Center	1 gal	Edge of site
Oso Berry	*Oemleria cerasiformis*	4	3' Center	1 gal	Higher up on the slope
Red-flowering Currant	*Ribes sanguineum*	8	3' Center	1 gal	
Salmonberry	*Rubus spectabilis*	10	3' Center	1 gal	Lower on the slope
Snowberry	*Symphoricarpos albus*	10	3' Center	2 gal	Space evenly around the site
Evergreen Huckleberry	*Vaccinium ovatum*	8	1' center	4"	Place more closely around trees.
Red Huckleberry	*Vaccinium parvifolium*	6	3' Center	1 gal	
Bleeding Heart	*Dicentra formosa*	24	3' Center	4"	Deeper shade is better
Kinnikinnick	*Arctostaphylos uva-ursi*	22	18" Center	4"	Stagger on hills
Coastal Strawberry	*Fragaria chiloensis*	18	3' Center	4"	Less shade is better.
Big-leaf Avens	*Geum macrophyllum*	36	5' Center	4"	
Twinflower	*Linnaea borealis*	16	5' Center	4"	Place higher up on the site

CONTINGENCIES

IF THERE IS A SIGNIFICANT PROBLEM WITH THE RESTORATION AREA MEETING PERFORMANCE STANDARDS, A CONTINGENCY PLAN WILL BE DEVELOPED AND IMPLEMENTED. CONTINGENCY PLANS CAN INCLUDE, BUT ARE NOT LIMITED TO: SOIL AMENDMENT, ADDITIONAL PLANT INSTALLATION, AND PLANT SUBSTITUTIONS OF TYPE, SIZE, QUANTITY, AND LOCATION.

PLAN DISCLAIMER - NOT FOR CONSTRUCTION

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THE WATERSHED COMPANY
SCIENCE & DESIGN
750 6TH STREET SOUTH
KIRKLAND WA 98033
425.822.5242
WWW.WATERSHEDCO.COM

PROJECT: **LUDWIG EXPANSION MITIGATION PLAN**

9921 SE 16TH STREET
BELLEVUE, WA 98004

PRINCIPAL:
PM: JKB
DRAWN BY: DJ
CHECKED BY: JKB
JOB NO.: 220918
DATE: 11/22/2022

REVISIONS

NO.	DESCRIPTION	DATE

NOT FOR CONSTRUCTION

PERMIT LEVEL DESIGN

11/22/2022

MITIGATION NOTES

VICINITY MAPS

LEGEND

- Steep Slope
- Steep Slope Buffer (50 FT)
- Parcel Boundaries

NOTES

1. CRITICAL AREAS DELINEATED BY PANGEO JULY 28, 2022.

2. PLACEMENT APPROXIMATED FROM SURVEY DATA. FOR PERMITTING NOT CONSTRUCTION.

0 20 40 80 Feet

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PROJECT:
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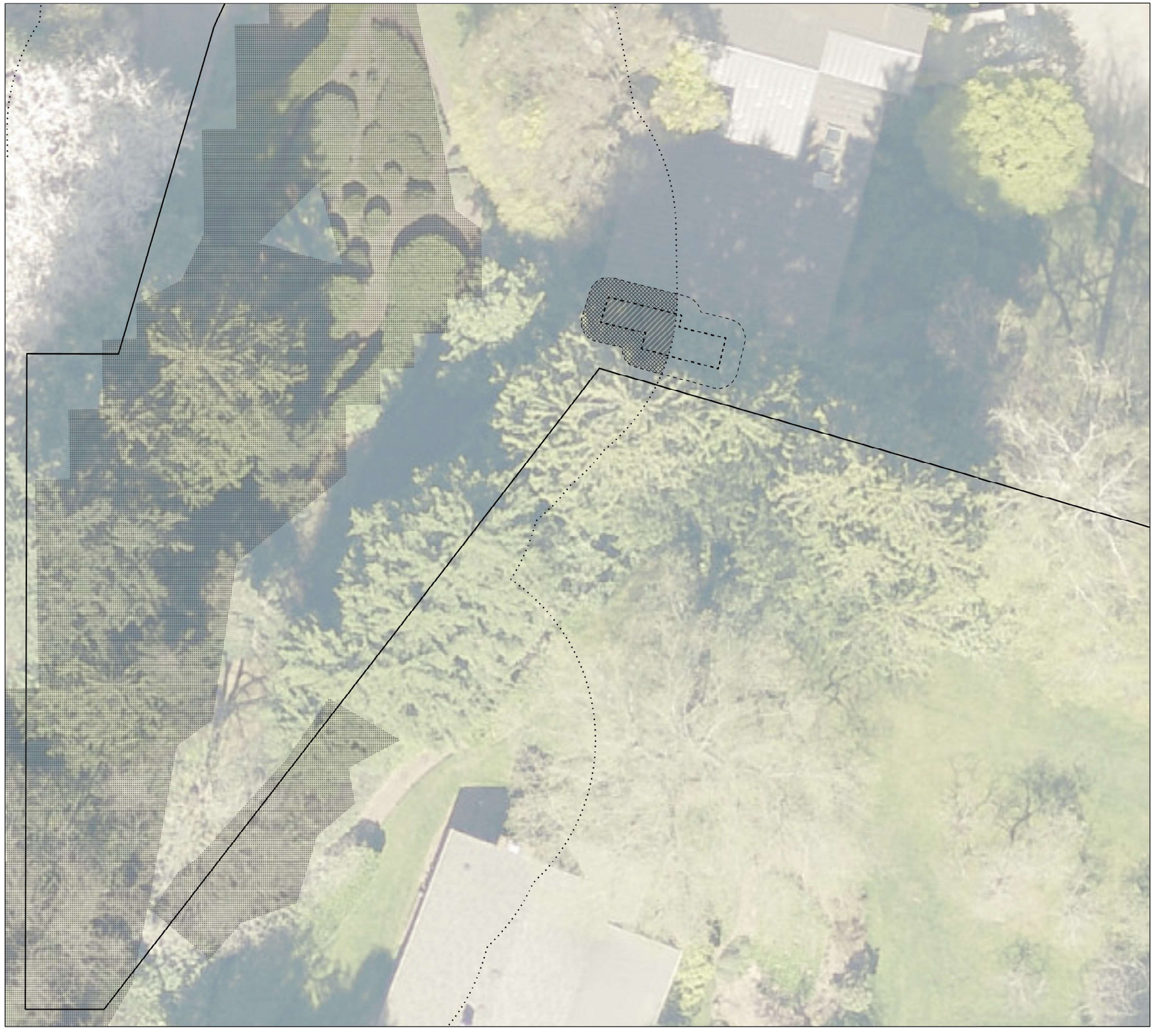
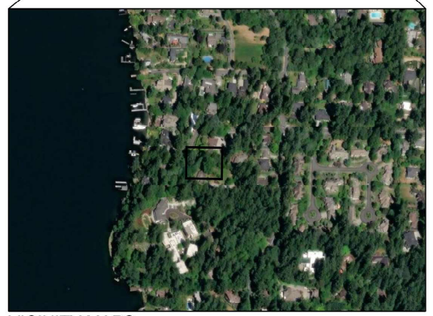
EXISTING CONDITIONS





VICINITY MAPS

LEGEND

- New Addition
- New Addition Permanent Impacts (154 SF)
- New Addition Construction Footprint (5 FT)
- New Addition Temporary Impacts (270 SF)
- Steep Slope
- Steep Slope Buffer (50 FT)
- Parcel Boundaries

NOTES

1. CRITICAL AREAS DELINEATED BY PANGEO JULY 28, 2022.

2. PLACEMENT APPROXIMATED FROM SURVEY DATA. FOR PERMITTING NOT CONSTRUCTION.

0 10 20 40 Feet

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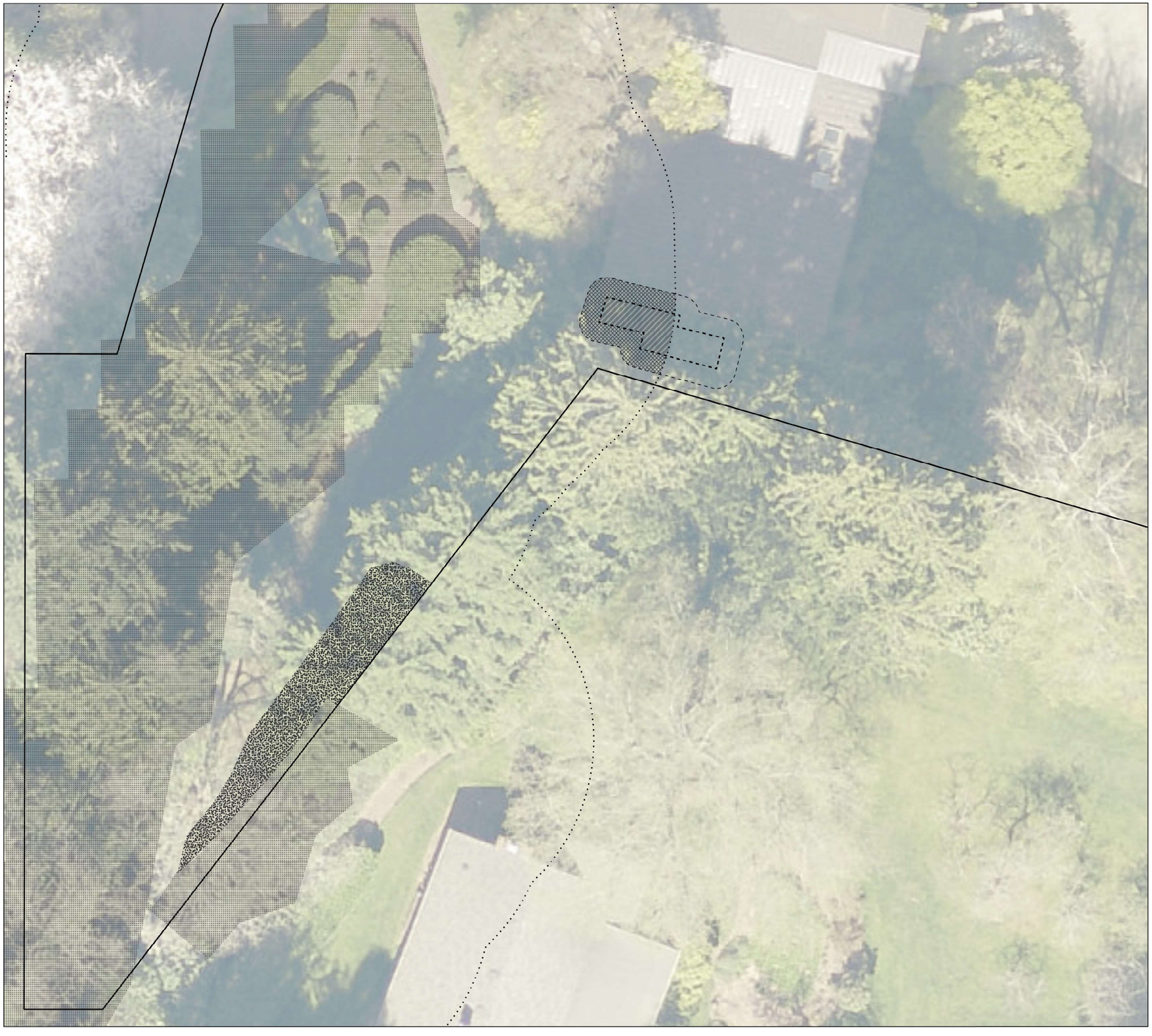
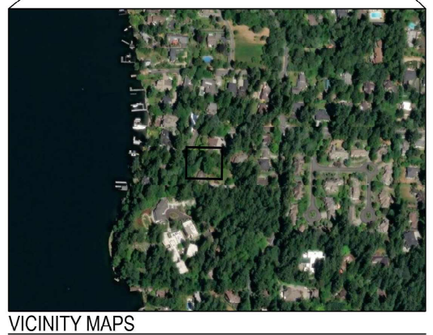
IMPACTS PLAN





VICINITY MAPS

LEGEND

- Proposed Mitigation (1,000 SF)
- New Addition
- New Addition Permanent Impacts (154 SF)
- New Addition Construction Footprint (5 FT)
- New Addition Temporary Impacts (270 SF)
- Steep Slope
- Steep Slope Buffer (50 FT)
- Parcel Boundaries

NOTES

1. CRITICAL AREAS DELINEATED BY PANGEO JULY 28, 2022.

2. PLACEMENT APPROXIMATED FROM SURVEY DATA. FOR PERMITTING NOT CONSTRUCTION.

3. SEE SHEET 4 FOR PLANT SCHEDULE.

0 10 20 40 Feet

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MITIGATION PLAN

MITIGATION PLAN

CONSTRUCTION SEQUENCE

THE FOLLOWING IMPLEMENTATION SEQUENCE PROVIDES A DESCRIPTION OF THE CONSTRUCTION, INCLUDING METHODS AND EQUIPMENT TO BE USED.

1. IDENTIFY AND MARK WORK LIMITS WITH HIGH VISIBILITY FENCING.
2. IDENTIFY AND PROTECT ALL UTILITIES THAT MAY EXIST IN THE CONSTRUCTION AREA.
3. INSTALL A SILT FENCE ALONG PROJECT CONSTRUCTION LIMITS.
4. EXCAVATE SOILS WHERE INDICATED PER THE PLANS.
5. REMOVE EXCAVATED SOILS AND OTHER SPOILS FROM THE SITE
6. BACKFILL WITH APPROPRIATE SOILS WHERE INDICATED, PER THE PLANS.
7. INSTALL NATIVE PLANTINGS DURING THE FIRST DORMANT SEASON (NOVEMBER THROUGH MARCH) OR AS DIRECTED BY THE PROJECT REPRESENTATIVE. USE SIZING AND CONDITION INFORMATION PROVIDED IN THE PLANTING SCHEDULE. IF PLANTS ARE INSTALLED OUTSIDE OF THE DORMANT SEASON, THEN A MINIMUM OF TWO INCHES OF WATER PER WEEK SHOULD BE PROVIDED DURING THE FIRST SUMMER.
8. SURVIVAL IN A HEALTHY CONDITION IS TO BE GUARANTEED BY THE LANDSCAPE CONTRACTOR FOR ALL OF THE PLANTED SPECIMENS THROUGH THEIR ENTIRE FIRST GROWING SEASON. AN ACCEPTANCE INSPECTION BY THE PROJECT REPRESENTATIVE OR PROJECT LANDSCAPE ARCHITECT IS TO BE MADE DURING THE PERIOD OF SEPTEMBER 15 THROUGH OCTOBER 15 FOLLOWING THE INITIAL DORMANT SEASON PLANTING (6-10 MONTHS LATER) AND ANY DEAD, MISSING, OR UNHEALTHY SPECIMENS ARE TO BE REPLACED. REPLACEMENT IS TO OCCUR DURING THE THEN-UPCOMING DORMANT SEASON. PLANTS ARE TO BE REPLACED PER PLANT SCHEDULE SPECIFICATIONS IN THE PLAN DOCUMENTS.
9. PLANTINGS ARE TO BE MONITORED AND MAINTAINED ENSURE SUCCESSFUL ENHANCEMENT OF THE STEEP SLOPE AND BUFFER AREA. SPECIES GOALS AND PERFORMANCE STANDARDS CAN BE FOUND IN APPENDIX B. IF PERFORMANCE STANDARDS ARE MET AT THE END OF THE MONITORING PERIOD, THE SITE WILL THEN BE DEEMED SUCCESSFUL.

FURTHER INFORMATION

- EQUIPMENT WILL BE MAINTAINED IN PROPER WORKING ORDER.
- STAGING AND STOCKPILING WILL OCCUR IN DESIGNATED AREAS OUTSIDE OF THE SLOPE OR BUFFERS.
- MATERIALS WILL BE PERMANENTLY DISPOSED OF OFF-SITE.

GRADING AND EXCAVATION

EXCAVATION WILL OCCUR AS FOLLOWS:

- LIGHT TRACKED EXCAVATORS AND/OR SKID STEER ACCESS THE SITE THOUGH THE DRIVEWAY AND THE ROAD TO THE NORTH.
- GRADING WILL ALTER THE EXITING GRADE TO THE DEGREE INDICATED IN THE PLANS. FILL TO ACHIEVE THE DESIRED GRADE WILL BE INSTALLED MANUALLY OR WITH MACHINES PER THE PLANS.
- THE SPOILS WILL BE STOCKPILED OUTSIDE OF THE SLOPES OR BUFFERS AND DISPOSED OFF-SITE.
- APPROPRIATE TOPSOIL WILL BE ADDED TO A DEPTH OF NO MORE THAN 4 INCHES TO AREAS GRADED OR TEMPORARILY IMPACTED BY CONSTRUCTION.

MITIGATION PLANTINGS

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   D. AVOID AND MINIMIZE DISTURBANCE AND/OR COMPACTION TO ROOTS OF ESTABLISHED NATIVE TREES TO BE RETAINED WHEN REMOVING VEGETATION FROM WITHIN TREE DRIPLINES.
2. INSTALL COIR ON CLEARED STEEP SLOPE MITIGATION AREAS PER PLAN DETAIL.
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   A. ENSURE MULCH DOES NOT TOUCH STEMS OF EXISTING (OR INSTALLED) VEGETATION.

MAINTENANCE AND MONITORING

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4. ESTIMATE OF NATIVE COVER IN THE MITIGATION AREA.
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   A. GREATER THAN 50% NATIVE SPECIES COVERAGE IN YEAR 1
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3. INVASIVE SPECIES COVERAGE
   A. LESS THAN 50% INVASIVE SPECIES COVERAGE IN YEAR 1
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Common Name	Botanical Name	Quantity	Spacing	Size	Placement Notes
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